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Physical activity and mental well-being in corporate and university employees : understanding relationships

PHYSICAL ACTIVITY AND MENTAL WELL-BEING IN CORPORATE AND UNIVERSITY EMPLOYEES: UNDERSTANDING RELATIONSHIPS

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ABSTRACT

This thesis examined the structure and nature of the relationships between physical activity and three components of mental well-being (physical, work-related, and global) in corporate and University employees. The first study tested a hierarchically based model which specified the interrelationships between exercise participation and indicators of the three components of well-being in a sample of corporate employees. Using Structural Equation Modelling (SEM), the results revealed a very good model fit. Exercise participation was directly related to indicators of physical well-being and enthusiasm at work, and indirectly with more global constructs of well-being (self-esteem, life satisfaction and job satisfaction). In order to examine the nature of these relationships further, Study 2 explored physical activity and well-being typologies using the same sample. A hierarchical cluster analysis revealed four distinct groups of employees, demonstrating the multi-dimensional nature of the relationship between physical activity and mental well-being. Using a qualitative approach, Study 3 sought to confirm the existence of the physical activity and mental well-being typologies, and explore potential psycho-social mechanisms linking physical activity participation with well-being. The results found general support for the existence of the profiles, and a range of possible psycho-social mechanisms, one of which was the regulation underlying the exercise behaviour. To explore the generalisability of the latter, Study 4 examined the role of exercise autonomy and its relationship with well-being using a large sample (N = 776) of University secretarial and administrative employees. The results provided support for the suggestion that the regulation underlying the exercise behaviour is important in understanding the relationship between physical activity and mental well-being. Finally, using the same sample, Study 5 examined well-being typologies of the physically inactive participants and performed a needs analysis for future exercise- and modular programmes in a new Centre for Sport, Exercise and Health in their workplace. This information may guide more cost-effective future interventions to promote activity and well-being in the workplace. The results of the present thesis are discussed in relation to implications for future practice and research directions.

DEDICATION AND ACKNOWLEDGEMENTS

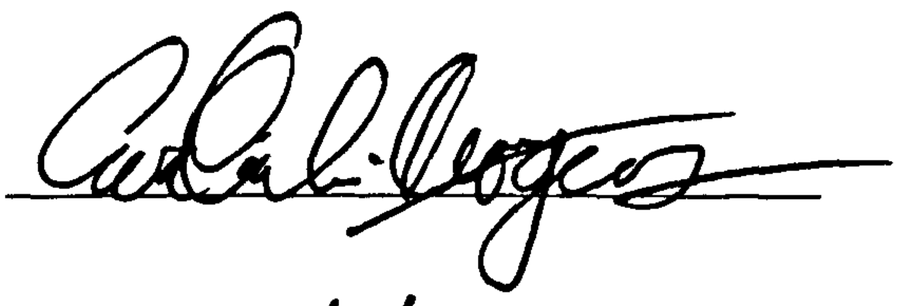
This thesis is in dedication to my family (Karen, Niels Jørgen, Liselotte, Claus, and Lasse) who always gives me support and unconditional love. I would not have done this thesis without them. I would also like to thank my main sponsor, my dad, whose generosity has been amazing. My appreciation and gratitude is extended to Prof. Ken Fox. Not only has he shared his ideas and expertise with me, he has also been the most supportive supervisor any student could ask for, and a good friend. My partner, Nikos, has provided practical and emotional support all the way through this thesis, and believed in me when I doubted myself. I would also like to thank my closest friends, Christina LaForce, Jonas Petersen, and Rikke Petersen, who are always there to listen. Finally, the thesis could not have been done without the employees who volunteered to take part in the studies, and I greatly appreciate their participation.

AUTHORS DECLARATION

I declare that the work in this thesis was carried out in accordance with the Regulations of the University of Bristol. The work is original except where indicated by special reference in the text and no part of the thesis has been submitted for any other degree.

Any views expressed in the thesis are those of the author and in no way represent those of the University of Bristol.

The thesis has not been presented to any other University for examination either in the United Kingdom or overseas.

Signed: 

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CHAPTER ONE: INTRODUCTION

The Department of Health (DoH) recently published a white paper "Saving Lives: Our Healthier Nation" (1999) with the main goal of improving the health of the British population and to reduce health inequalities by the year 2010. One of the four key areas in this report is mental health. This focus may be seen in the light of the relatively high prevalence of mental disorders. For example, the 1995 Health Survey for England suggests that mental illness affects as much as twenty percent of women and fourteen percent of men at some stage in their lives. In addition to human suffering, the cost of mental ill health to the NHS and social services is estimated to be as much as £7.5 billion each year (Department of Health, 1999). Preventing mental ill health, such as clinical depression, is therefore imperative. Taking a preventative approach to mental health requires an increasing focus on the promotion of mental well-being.

Although well-being has been conceptualised in different ways, all definitions emphasise *positive* psychological states as opposed to the absence of negative cognitions and feelings. In addition, according to Caspersen, Powell, and Merritt (1994), well-being is one of two elements of quality of life and is concerned with the *subjective internal states* of the individual, or the way in which the individual feels physically and mentally. It determines the extent to which people function in their everyday lives, and the way they feel, understand, and communicate. In their definition of health, the World Health Organization (WHO, 1997) recognises that mental well-being plays an all-important role in health measurements as they state that health incorporates "a state of complete physical, mental, and social well-being not merely the absence of disease" (p. 1). Building on the definition of the WHO, health as a concept is defined herein as "a human condition with physical, social and psychological dimensions, each characterized on a continuum with positive and negative poles. Positive health is associated with a capacity to enjoy life and to withstand challenges: it is not merely the absence of disease" (Bouchard, McPherson, Shephard, Stephens, & Sutton, 1989, p. 6).

The resurgence of the so-called movement of positive psychology within the past few years may, in part, be seen in the light of findings showing that happiness and positive emotional states may predict objective health (Argyle, 1997; Salovey, Rothman, Detweiler, & Steward, 2000), and also from the recognition that there has been an over-reliance on the avoidance of human misery in the field of psychology

(Myers & Diener, 1995). This relative paucity of research into positive psychological states has recently been criticised. Seligman and Csikszentmihalyi (2000) state that "...psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue. Treatment is not just fixing what is broken; it is nurturing what is best" (p. 7). One of the major reasons why positive psychological states should be studied separately is due to the fact that positive and negative affect are independent constructs. Hence, positive feelings and well-being cannot be inferred from the absence of negative feelings. For example, evidence from medical outcomes studies show that although disease and its treatment often decrease life satisfaction and positive affect, there is often no increase in negative affect (Stewart, Ware, Sherbourne, & Wells, 1992). Accordingly, more research should be dedicated to studying elements that enhance positive mental health. A focus on enhancing mental well-being should also facilitate an understanding of how mental illness may be prevented. To this end, this thesis focuses on a range of positive psychological well-being variables relevant to corporate populations.

International organisations and governmental institutions increasingly recognise that the workplace is an important venue for improving health. As a consequence and as stated by Taylor (2000), the Confederation of British Industry, the Health Education Authority, and the DoH are all trying to persuade senior managers in organisations to implement work-site health promotion programmes and activities. It is generally acknowledged that the workplace is an important venue for the introduction of health initiatives to a large segment of the adult population (Department of Health, 1999; US Department of Health and Human Services, 1996). As a result, governments and international institutions have recognised the need for larger scale and more long-term occupational health strategies. For example, in the UK, the DoH and the Health and Safety Executive (HSE) have jointly established a healthy workplace initiative (Department of Health, 1999). This initiative includes targets designed to reduce lifestyle related diseases through strategies based in the work setting. This initiative is part of an effort to place health in the forefront of business thinking and organisational development.

The incentives for these initiatives are partly based on figures that reveal the extent of the cost to society as a result of ill health. In the UK alone, the Health and

Safety Executive (HSE; 1990) established that approximately 40 million working days were lost per year in the UK due to stress-related disorders. The associated costs of ill health to the employers in the UK in 1990 were estimated to be in the region of £4.5 billion. A more recent estimate by the HSE showed that a minimum of fifty percent of all lost days at work were due to work-related stress (Cooper, Liukkonen, & Cartwright 1996). On an international scale, the European Foundation's 1996 Working Conditions in Europe established that 600 million working days are lost per year in the EU due to work-related ill health. Mental health and well-being issues account for a large part of these lost work days. For example, stress, depression, and anxiety are the second leading cause of sickness absence in the workplace (Department of Health, 1999). A survey by the European Agency for Safety and Health at Work run in 2000, which was carried out with statutory bodies in all EU member states, found that most of them identified stress and other psycho-social issues as a current and a future priority.

Well-being in the workplace is also a key to enhancing the health of the workforce for several reasons. According to Danna and Griffin (1999), one of the reasons why well-being should be an important focus in the workplace is because the individual's experiences at work not only affects him or her while at work, which in itself may have implications for the health of the organisation at large, but may also spill over into domains outside working life. In addition, health and well-being have important consequences for the individual employee as well as for the organisation in which he or she works (Danna & Griffin, 1999), such as illness-related absenteeism (Aldana, 2001; Anderson, Serxner, & Gold, 2001) and performance, sometimes measured in terms of perceptions (e.g. Leutzinger & Blanke, 1991). However, the gains of health promotion programmes are generally agreed to go beyond financial profits. Improving and sustaining the health and well-being of employees is considered the "right thing to do", and initiating and maintaining health promotion programmes may be a sign to the employees that they are valued by their company. Health promotion programmes may therefore work to improve the image of a company (i.e. company as caring about the welfare of its employees), and may consequently attract productive employees (DiNubile & Sherman, 1999).

Exercise and physical activity participation is one element of many worksite health promotion programmes. A wide range of work-site exercise promotion activities

exists ranging from the provision of information to reduced fees to local health clubs, to the provision of gymnasiums, badminton and squash courts. Despite the well-documented influence of physical activity on elements of health illustrated above, the implementation of exercise programmes in Europe is not as common as other workplace health promotion activities such as smoking cessation programmes (Malzon & Lindsay, 1992). This is perhaps surprising, as according to Sparks, Faragher, and Cooper (2001), the benefits of introducing these programmes and thereby developing a healthy workforce may have positive implications for individual health (e.g. through weight loss and stress reduction) and for the organisation as a whole through lower levels of absenteeism and turnover, higher levels of job satisfaction, enhanced levels of productivity and an improved corporate image (e.g. Daley & Parfitt, 1996). The introduction of exercise programmes in the workplace may be seen in the light of evidence linking physical activity to the prevention of physical illnesses (e.g. Berlin & Colditz, 1990; Powell, Thompson, Casperson, & Kendrick, 1987). Fewer studies have examined the relationship between exercise participation and indicators of mental well-being in employees, although evidence is now accumulating on the efficacy of exercise in the improvement of quality of life and well-being (Biddle, Fox, & Boutcher, 2000). As yet, research has not established why exercise may improve well-being, but recent suggestions support psycho-social processes (e.g. Fox, 1999; Rejeski et al., 2001).

According to DiNubile and Sherman (1999), one of the problems facing researchers and corporations alike is that relatively few employees choose to participate in work-site exercise programmes, and approximately fifty percent of those who start an exercise programme discontinue participation within a few months (Shephard, 1999). Those who do tend to participate are often a health-conscious minority who have previously attended community fitness programmes, and who as a result take part in work-site exercise programmes without much scope for improvement (Shephard, 1999). Shephard (1999) concluded that the most effective work-site exercise programme, as well as the most cost-effective, is to provide the access to a well-equipped exercise facility as well as implementing an active targeting approach to those employees who do not take part. Often programmes are not targeted to specific sub-groups of employees, which may be part of the problem. A useful targeting approach for wellness interventions may be to identify employees who are coping poorly in life and at work,

and give them some options for types of programmes that may be realistically carried out at the workplace. Providing the different options for programmes may promote interest among employees who would otherwise not be attracted to employee exercise programmes. As a step in the direction of developing the University of Bristol as a health-enhancing workplace, the establishment of a new Sport, Exercise and Health centre at the University in September 2002 provides an ideal opportunity to target employees who may benefit from taking part in various exercise and wellness programmes. Indeed one of the main purposes of this thesis is to develop physical activity and well-being typologies of employees which may guide future exercise and wellness interventions in the workplace. Furthermore, the results of this study may therefore have practical implications for the development of programmes at the new exercise and health centre at the University of Bristol.

The main aim of the present thesis was to develop theoretically grounded well-being typologies of employees in different settings, who differ in their levels of physical activity. The results of this thesis may have wider implications for developing targeting strategies for wellness and exercise interventions in the workplace. In view of this, the nature of the present thesis is structured as follows.

The first study examined the indirect and direct relationships between general exercise participation and components of well-being among a sample of corporate employees using a hierarchical model of well-being. Following on from these results, typologies of physical activity and well-being were developed to identify sub-groups of a relatively physically active sample with high versus low levels of well-being, which will shed light on the multi-dimensional relationship between physical activity and mental well-being. An independent qualitative study was then carried out to provide some confirmatory evidence to the cluster solution and in order to provide some meaning to the individual clusters. In addition, mechanisms of well-being change through exercise were explored on an individual level. Based on findings from the qualitative study, the fourth study examined whether self-determined motivation to exercise was a significantly better predictor of the well-being components than controlled types of exercise regulation. In addition, building on links between general physical activity and exercise participation and the mental well-being components, this study examined differences on these well-being components between groups which

engaged in different types of physical activity or no physical activity. The final study extended the previous studies in this thesis to create typologies of well-being and amotivation to exercise among a sub-sample of non-exercisers to identify those groups of employees who would appear to be the most important to target for exercise and wellness interventions in the workplace.

CHAPTER TWO: REVIEW OF LITERATURE

The review of relevant literature is organised into five main sections. The first section presents an overview of physical activity and health with a special emphasis on the relationship between exercise and mental health. The second section considers the rationale for implementing employee exercise programmes in the workplace. The third section describes the concept and importance of targeting for well-being and exercise. The fourth section considers the critical constructs of mental well-being considered in this thesis, and a discussion on how exercise might relate to these. Finally, the fifth section presents the research questions which are considered in this thesis.

PHYSICAL ACTIVITY AND HEALTH

Definitions and prevalence of physical activity, exercise, and sport

Although the terms physical activity, exercise and sport are often used interchangeably, in the present thesis an effort is made to distinguish between these terms. Physical activity is the most all-encompassing constructs of the three and refers to "any body movement produced by muscular contraction that leads to a substantial increase in a person's energy expenditure" (Shephard, 1994, p. 1). These are expressed as kilocalories (kcals) or metabolic equivalents (MET-hr-wk), which is the ratio of energy expenditure, in any physical activity to the metabolic rate of sitting quietly (Ainsworth et al., 2000). Physical activity may include group or solitary activities, competitive sport, active living activities (including walking, cycling as a means of transportation), and aerobic or anaerobic exercise. In contrast, exercise refers to more structured and planned (Biddle & Mutrie, 1991) non-competitive forms of physical activity, which largely consists of exercise classes (such as aerobic dance), and individual activities such as jogging, weight-, and circuit training. Finally, sport activities include team-game activities and individual sports where some element of competition is involved (e.g. football, squash etc.). Therefore, throughout this thesis, physical activity is used as an indicator of total energy expenditure, attributable to gross movement, and may include exercise, sport, as well as active living activities. Where reference is being made to exercise or sport, the focus is narrower, and does *not* include active living activities.

The advances of labour-saving devices, and the increasing use of alternative forms of entertainment, such as television, computer and video games, are some of the main causes of the decreasing levels of activity among, at least, Western populations. For

example, the Allied Dunbar National Fitness Survey (1992) revealed that most British men and women were not sufficiently active to achieve important health outcomes. Sixty-five percent of males and females exercised less than three times a week for twenty minutes at a moderate intensity, and only 14 percent of males and 4 percent of females were exercising regularly at a vigorous intensity three times a week for at least twenty minutes. At the European level, a recent large-scale survey with a representative sample of adults from the fifteen member states of the European Union showed that overall the MET-hr-wk spent in leisure-time physical activity for the whole sample was 15.0 MET-hr-wk (i.e. number of hours taking part in each activity multiplied by the specific MET score summed across the week) (Martinez-Gonzalez et al., 2001). The survey also showed that males practice significantly more physical activity in their leisure-time than females. Furthermore, increasing body mass index is associated with lower levels of leisure-time physical activity (Martinez-Gonzalez et al., 2001).

Role of physical activity in health promotion and well-being

It has been argued that physical inactivity disturbs human functioning, as humans have been designed for movement (Sparling, Owen, Lambert, & Haskell, 2000). Considering the range of health benefits associated with a physically active lifestyle and the problems linked with a sedentary lifestyle, their argument seems to be supported. The following sections describe some of the main benefits of leading a physically active life, with a special emphasis of the role of exercise and physical activity in the promotion of mental well-being.

Physical health

Convincing evidence now exists that physical inactivity is a major risk factor of all-cause mortality and a range of diseases. Physical activity is also imperative in the prevention of CHD, type II diabetes, hypertension, osteoporosis and certain cancers, particularly cancer of the colon (Blair, Cheng, & Holder, 2001; Kaplan, Strawbridge, Cohen, & Hungerford, 1996). There is also evidence to suggest that increases in physical activity are associated with the prevention of weight gain over time (Antero Kesaniemi et al., 2001), and along with diet, physical activity is one of the two important elements in the treatment of obesity (Brownell, 1995).

Numerous studies have reported dose-response relationships between physical activity and all-cause mortality, and there is clear evidence that the more physically active individual has a significantly lower risk of all-cause mortality compared to the sedentary individual (Leon, Connett, Jacobs, & Rauramaa, 1987; Kushi et al., 1997; Paffenbarger et al., 1993). A consensus statement made by Antero Kesaniemi et al. (2001) support the existence of this dose-response relationship, with physical activity expending 1000 kcal/wk associated with a 30 percent reduction in all-cause mortality rates.

One of the main reasons for the inverse relationship between physical activity and all-cause mortality is that physical inactivity doubles the risk of coronary heart disease (CHD), which is the leading killer in the United Kingdom (Berlin & Colditz, 1990; Powell, Thompson, Casperson, & Kendrick, 1987). In line with this evidence, a prospective cohort study has demonstrated the relative risks of CHD for physical activity quartiles in middle-aged men and women. The study showed that the relative risks of CHD were moderately strong for sport and leisure activities, demonstrating an inverse relationship between physical activity and CHD (Folsom et al., 1997).

The current consensus with regard to the recommended dose of physical activity to improve physical health is the accumulation of thirty minutes of moderate intensity physical activity on most days of the week (Pate et al., 1995). Powell and Blair (1994) theorised that if fifty percent of the population increased their physical activity levels to the above recommendations, then a five to six percent reduction in mortality from CHD, diabetes and colon cancer could be achieved.

Mental health

The evidence of the effect of physical activity on mental health is also now accumulating, although it is still far outweighed by research examining the contribution of physical activity in the prevention of physical illnesses. One of the earliest reviews was carried out by Folkins and Sime in 1981. They reviewed experimental and quasi-experimental studies, which all demonstrated significant links between measures of physical fitness and mental health among normal as well as clinical populations. This review provided initial support for the positive effect of fitness training on mood, self-concept, and behaviours based in the work setting (e.g. absenteeism). More recent

evidence has provided support for the efficacy of exercise in the treatment of clinical mental disorders, in the improvement of the quality of life of those who are mentally ill, and in the promotion of psychological well-being for the general population (Fox, Boutcher, Faulkner, & Biddle, 2000). It is the latter that is the focus of this thesis, and therefore, only key findings relating to the usefulness of exercise in the alleviation of clinical disorders are reviewed here.

Clinically defined depression is one of the most common mental illnesses of our time, and it is estimated to affect approximately five to ten percent of most Western populations (Weismann & Klerman, 1992). WHO (2001) have estimated that, if current trends continue, by the year 2020, the burden of depression will increase to 5.7 percent of the total burden of disease, becoming the second leading cause of Disability-Adjusted Life Years (DALY) lost, which is a unit used to measure the burden of a particular disease. That means that depression would be second only to ischaemic heart disease for DALYs lost for both sexes worldwide.

In terms of the role of exercise in the treatment of depression, there is strong evidence to suggest that exercise is effective (Craft & Landers, 1998; Mutrie, 2000; North, McCullagh, & Tran, 1990). There seems to be two significant roles of physical activity here: 1) it may prevent the onset of clinical depression (Mutrie, 2000), and 2) it may be used as a form of treatment, as the effect of physical activity on clinical depression seems to be as great as the effects of other psycho-therapeutic interventions (Mutrie, 2000). As stated by Fox (2000), exercise may be used on its own or as an adjunct to psycho-tropic medication or cognitive-behavioural therapy to improve mental health. The added benefits to using exercise as a form of treatment is that it is cheap, self-sustaining, and is associated with negligible or no negative side effects (Fox, 2000).

Several studies have been carried out within the past few decades to help determine the anxiolytic (i.e. anxiety-reducing) effects of exercise, s (Long & Van Stavel, 1995; McDonald & Hodgdon, 1991; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991). It appears that the anxiolytic effects of exercise are stronger for trait- compared to state anxiety (Petruzzello et al., 1991). Furthermore, studies suggest a low to moderate anxiolytic effect of physical activity for clinical and non-clinical populations (Taylor, 2000). As with studies of depression, the results of Taylor's (2000)

review suggested that physical activity is as effective in the treatment of anxiety as other medical-free treatments.

However, just as important as the relationship between physical activity and the absence of negative psychological states is the role of physical activity and exercise in the promotion of mental well-being, i.e. the promotion of positive psychological states. As mentioned in Chapter 1, this is because the presence of positive psychological states is imperative for functioning, adjustment, and health. Indeed, major reviews and meta-analyses have supported the effect of exercise on different indicators of positive mental well-being, such as self-esteem (Fox, 2000; Scully, Kremer, Meade, Graham, & Dudgeon, 1998), life satisfaction and health-related quality of life (Caspersen et al., 1994; Rejeski, Brawley, & Schumaker, 1996), and mood and affect (Biddle, 2000). The relations between exercise and the specific well-being variables of interest in this thesis are discussed in a later section (see: "A holistic conceptualisation of employee well-being and its relation to exercise").

Psycho-social mechanisms linking exercise with mental well-being

Despite the findings linking exercise with mental health and well-being, the mechanisms by which the positive effects of exercise occur have not yet been established. Hypothesised explanations, however, can generally be grouped as psycho-physiological, psycho-biochemical, and psycho-social explanations (*Biddle, 2000*). Although clearly physiological and bio-chemical explanations may, for some people, and in some circumstances, explain part of the effect of exercise on well-being (e.g. Boutcher, 1993), this thesis focuses on some of the psycho-social processes that may account for changes in well-being as a result of exercise.

Although several physiological and bio-chemical hypotheses (e.g. endorphins, catecolamines, and hyperthermic) have been proposed, they have received equivocal support. For example, one of the most popular bio-chemical explanations is the endorphin hypothesis which proposes that as the person exercises, increased levels of endorphins appear in the blood which are morphine-like chemicals that work to relieve pain. According to this theory, the endorphin increases are responsible for the improvement in mood, the "runner's high", and the anti-depressant effect of exercise (Hoffman, 1997). However, there have been suggestions that the endorphin hypothesis

only applies to high intensity exercise, and may not explain any psychological effects of light to moderate physical activity (e.g. Fox, 1999). Finally, as stated by Biddle and Mutrie (1991), although endorphins may be partly responsible for enhanced mood among depressed populations, they do not seem to explain the improvements in mood often seen in the general population. The finding that increases in mental well-being sometimes take place without changes in physiological indicators (e.g. Tate & Petruzzello, 1995) seems to contraindicate a reliance on generic physiological or biochemical explanations.

It follows from physiological and bio-chemical hypotheses that a particular *dose* (i.e. mode, frequency, intensity, and duration) of activity should be associated with a particular *response* in terms of mental health. However, there are some inherent difficulties in establishing a universal prescription guideline for mental health and well-being (Rejeski, 1994). According to Rejeski (1994), the stimulus-response issue (i.e. dose-response) is biologically and reductionistically defined and does not take into account the cognitive and emotional state of the individual, and therefore sees the individual as responding to passive rather than active agents. However, engaging in an exercise programme is an active process, and a lot of different factors have beneficial or detrimental effects on people's well-being, depending on who that individual is. In addition, research has shown that factors such as motivational climates (Ntoumanis & Biddle, 1999a) and goals (Duda, 1993; Ntoumanis & Biddle, 1999b) play important roles in determining the effects of exercise participation on affective outcomes. Another study by Tuson, Sinyor, and Pelletier (1995) tested the efficacy of two psychological processes. Based on the theory of optimal stimulation (Csikszentmihalyi, 1982), in which exercise is hypothesised to positively affect mental well-being only in situations in which the demands of the exercise activity match the individual's skills, the authors found that Rates of Perceived Exertion (RPE), a subjective indicator of exercise intensity, was a more effective predictor of affective change following exercise compared to objective or actual exercise intensity. Another factor determining the affective outcome of exercise was pre-existing levels of affect (Tuson et al., 1995). One of the implications is that a wide range of exercise intensities may be effective in enhancing mental well-being depending on the individual. Therefore, it is highly unlikely that any single dose of activity will have a universal effect on mental well-

being for all individuals (Rejeski, 1994). The suggestions that psycho-social mechanisms play an important role in the understanding of the link between exercise and mental well-being are supported by findings showing that, just as physical health benefits can occur without any psychological benefits, psycho-social benefits may arise without the accompaniment of physiological changes (e.g. Tate & Petruzzello, 1995).

Hence, a case can be argued that "there has been far too much emphasis placed on the role of changes in maximal aerobic power as the key exercise manipulation for chronic dose-response studies of psycho-social outcomes" (Rejeski, 1994, p. 1053). By focusing exclusively on physiological explanations, studies ignore the possibility that psycho-social outcomes may be partly explained by the factors occurring during the *process* of exercising. Indeed, engaging in exercise consist of much more than merely moving the body (Rejeski, 1994). Consistent with his arguments, Fox (1999) proposed several processes to explain the effects of exercise on self-esteem. These processes are likely to be applicable in the explanation of other aspects of well-being, too. Specifically, they are:

- A positive change in body image, body satisfaction, and body acceptance
- Improving feelings of perceived physical competence through improved abilities, prowess, and fitness
- Promoting a sense of belonging through formed relationships with the exercise leaders and other participants in the exercise group, and
- Enhancing feelings of autonomy and personal control over the appearance and functioning of the body

Later sections of this review will discuss the salience of the physical self as an important mechanism by which exercise may affect more global elements of mental well-being (see "Physical satisfaction as a domain of life satisfaction?", "Life satisfaction and physical activity" and "Exercise, self-esteem and physical self-worth").

Although it has often been theorised that perceptions of competence are an important factor in the generation of well-being (e.g. Harter, 1990), the motivation underlying achievements may also be important to consider. Indeed, it has been suggested that the individual's true self develops as he or she acts autonomously (i.e. volitionally) at the same time as experiencing an inner sense of competence and feelings

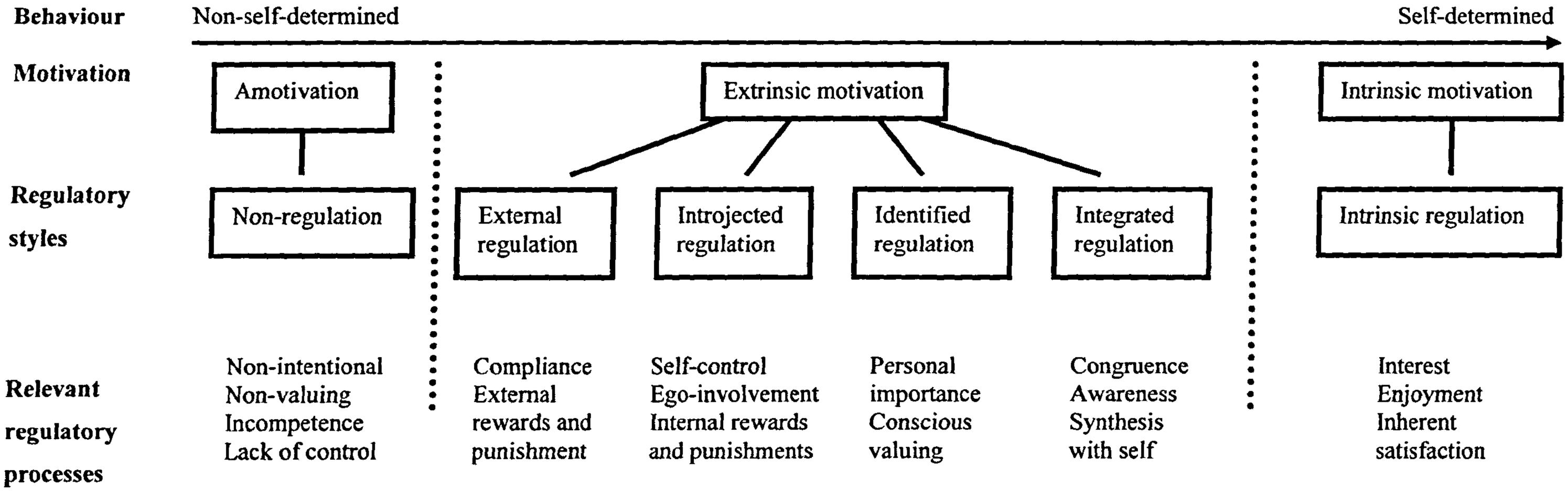
of relatedness to others (Deci & Ryan, 1995). In relation to exercise, it is the former that has received notable attention, and to which I shall now turn.

Perceptions of autonomy refer to the extent to which the individual feels that he or she is the origin and not the "pawn" of the behaviour in question, and therefore that he or she has a sense of choice, and presumably control, of the behaviour (Deci & Ryan, 1991). Actions that are autonomous are said to be self-determined, and reflect those behaviours that stem from an integrated sense of self (Deci & Ryan, 1995). In turn, feeling autonomous for a behaviour and having an integrated sense of self is associated with more positive mental health. In contrast, a less integrated sense of self is related to negative mental health (Deci & Ryan, 1995). In addition, Sheldon and Kasser (2001) reviewed evidence which has found that well-being measures were significantly correlated with autonomy of the individual's strivings (or goals). Specifically, more autonomously regulated strivings appeared to be significantly related to life satisfaction (Sheldon & Kasser, 2001). In the exercise setting, there is some support for the positive role of self-determined behaviour in the initiation and generalisation of exercise behaviour in children (Chatzisarantis, Biddle, & Meek, 1997; Goudas, Biddle, & Fox, 1994). Ryan et al. (1997) have also concluded that more autonomous forms of regulated behaviours are associated with greater persistence and mental well-being (Ryan, Kuhl, & Deci, 1997).

One of the unique features of SDT is that it proposes that extrinsic motivation varies according to its relative autonomy (Vallerand, 1997). Organismic Integration Theory (OIT; Deci & Ryan, 1985) is a sub-theory of SDT that deals with the different forms of extrinsic motivation plus the contextual factors that facilitate versus hinder internalisation and integration of the regulation for the behaviour. It is the former element of OIT that is dealt with in this thesis (more specifically in Study 4). Specifically, the individual may show amotivation (i.e. the behaviour is not intentional and is not expected to lead to desired outcomes), external regulation (i.e. performing a behaviour because one feels has to), introjected regulation (i.e. performing the behaviour out of guilt), identified regulation (i.e. valuing the behaviour as the means to an end), integrated regulation (i.e. the behaviour is congruent with one's values and identity), or intrinsic motivation (i.e. performing the behaviour out of pure pleasure) toward an activity (see the OIT taxonomy of motivational types in Figure 2.1).

If follows from the above, that the more intrinsically motivated behaviours, which originate from well-integrated personal values and regulatory processes, are characterised by a greater involvement of the self in the initiation and regulation of any action than motivations by extrinsic factors (Deci & Ryan, 1991). This is why motivations for exercise may be an important mechanism in the relationship between exercise and well-being. Overall, the above rationale supports the importance of increasingly focusing on the process of exercising rather than outcomes. The interview analysis in Study 3 will reveal whether this seems to hold for the individual employee.

Figure 2.1. The self-determination continuum showing types of motivation with their regulatory styles and corresponding processes (modified from Ryan & Deci, 2000)



The suggestion that social interaction is the mediating factor between exercise and well-being has also received some support. Specifically, a population-based study has found that those people who exercise at least twice per week report stronger feelings of social integration than those who exercise less frequently (Hassmen, Koivula, & Uutela, 2000). In addition, those taking part in exercise prescription schemes report social benefits from their participation (Fox, Biddle, Edmunds, Bowler, & Killoran, 1997). Finally, there is some evidence to suggest that social integration is an important determinant of adherence to exercise programmes (Duncan, Duncan, & McAuley, 1993).

The above are just some of the suggested psycho-social mechanisms proposed to account for the psychological benefits of exercise. Clearly others exist, too. These include exercise as a means of alleviating stress (see "Employee fitness and exercise programmes: The benefits to employees and organisations"), and exercise as time-out.

WORK-SITE HEALTH PROMOTION PROGRAMMES WITH A SPECIAL EMPHASIS ON EMPLOYEE EXERCISE PROGRAMMES

A rationale for implementing work-site health promotion programmes

Work-site health promotion refers to "the combination of educational, organizational, and environmental activities and programs designed to motivate and support healthy lifestyles among a company's employees and their families" (Chenoweth, 1998, p. 5). Generally, health promotion programmes include smoking cessation, nutrition, weight loss, physical fitness and exercise, stress management as well as other programmes designed to reduce risk factors for disease. Worksite health promotion programmes have been implemented in most Western countries, but were first implemented, and are more prevalent, in the United States. Consequently, most of the literature on work-site health promotion is North American (Griffiths, 1996).

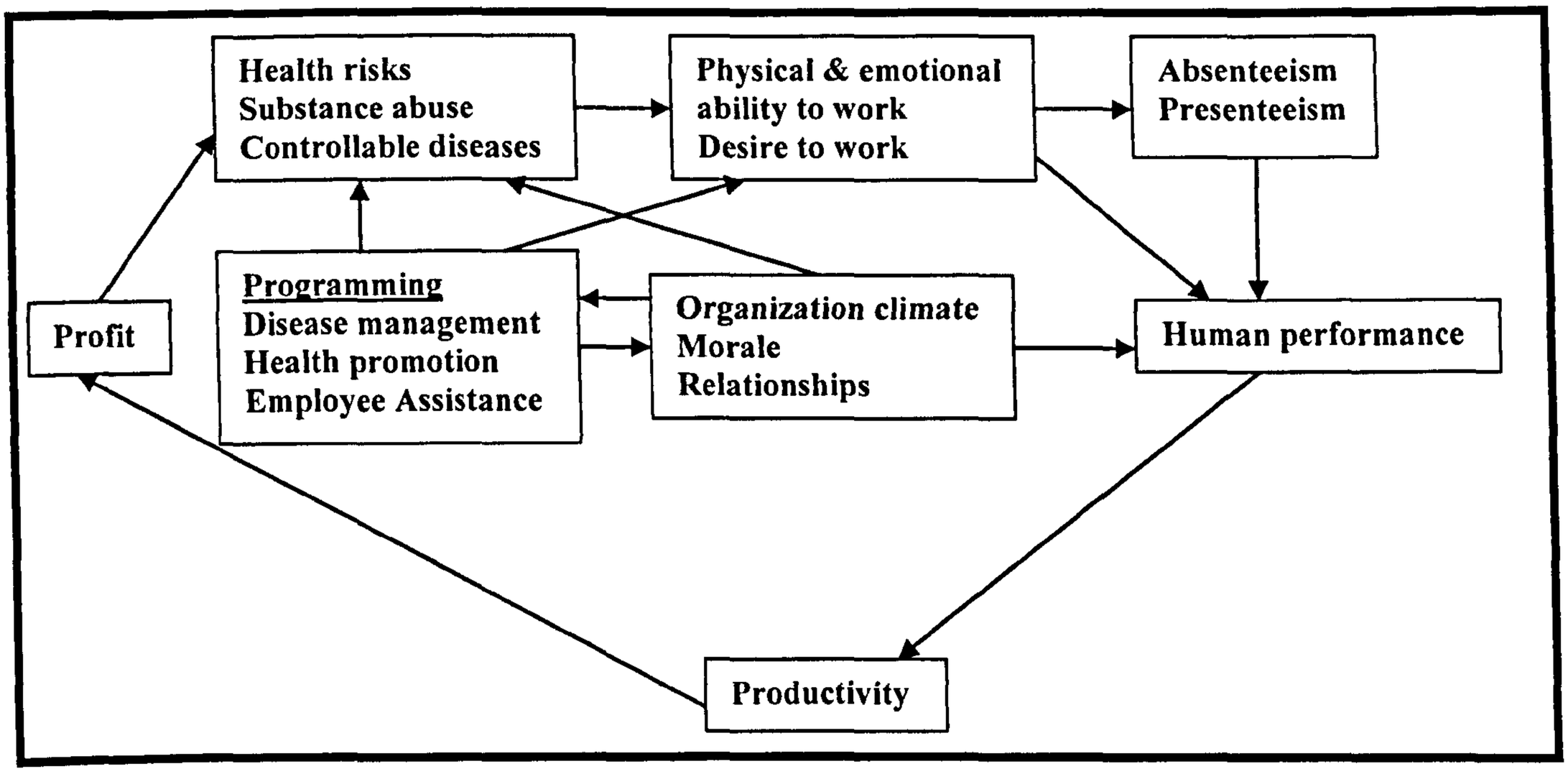
One of the initial motivators for North American companies to implement these programmes was increases in health care costs (Chenoweth, 1998), and it was believed that fitness increases would make employees more healthy, and consequently less absent from work. Indeed, some research evidence does support a significant relationship between participation in employee fitness and exercise programmes and

reductions in health-care costs although findings are inconsistent and suffer from methodological weaknesses (Aldana, 2001).

Most of the evidence relating to financial benefits of employee health has come from studies examining the effect of *general* health promotion programmes, of which employee exercise programmes may be one element. These financial benefits have recently been reviewed in a special issue of the American Journal of Health Promotion. A series of studies indicate that health promotion programmes reduce absenteeism using cost-benefit analysis, i.e. the financial benefits of the programmes outweigh the costs of implementing those programmes (Aldana, 2001; Anderson et al., 2001). However, the causal nature of the relationship between employee exercise programmes and rates of absenteeism is not as yet clearly established. It is suggested that the involvement in fitness programmes may increase morale and commitment to the company, which, in turn, reduces absenteeism (Aldana, 2001).

The development of work-site health promotion in European countries has generally been slower, which may partly be due to the state provision of health care (Griffiths, 1996). But decreasing health care costs are only a fraction of the benefits that may accrue from participation in health promotion programmes at the workplace, and even in the US, the Institute for Health and Productivity Management (IHPM; 2001) now recognise that "another even more powerful way to improve productivity is through increasing workers' ability to contribute more effectively" (p. 12). O'Donnell (2000) suggests that there is a need to focus efforts on health and productivity management in the workplace, and proposes a framework describing the mechanisms linking health, productivity, and profit (see Figure 2.2).

Figure 2.2. Mechanisms linking health, productivity, and profit (modified from O'Donnell, 2000, p. 215)



One of the main messages from the model in Figure 2.2 is that human performance at work is greater when employees are physically and emotionally able to work, as well as when they have the desire to work. Therefore, factors such as job satisfaction and work-related affective experiences seem to play important roles in this equation. In addition, productivity is very difficult to measure directly, especially in white-collar occupations (Kirkcaldy, Cooper, Shephard, & Brown, 1994), and consequently studies focusing on enhancing the well-being of employees should be worthwhile from the organisation's point of view as it may lead to enhanced productivity and profit. Although the model is preliminary and as yet untested, it illustrates contemporary thinking relating health and productivity at the workplace.

Direct financial benefits aside, it is interesting to note, that in a survey carried out in the UK with major organisations, Sigman (1992) reported that the major incentives for implementing work-site health promotion programmes was legislation (the company would be seen to care about the health and safety of the employees), improving the relationship between the employer and the employees, and the desire to develop staff morale, which is seen as a reflection of the individual's level of job satisfaction. These incentives were much more important to organisations than any financial incentives. In addition, Shephard (1992) reported that, in the US, the most important objectives of employee exercise programmes are to improve staff morale and employee health, rather

than to demonstrate direct cost benefits of the programmes. Indeed, the implications of improving staff morale and job satisfaction may be important in retaining employees (DiNubile & Sherman, 1999), and as shown in Figure 2.2, in enhancing productivity. In summary, these above mentioned indicators of caring about employee welfare, should help to develop "organisational healthiness" (Griffiths, 1996).

Employee fitness and exercise programmes: The benefits to employees and organisations

Employee fitness and exercise programmes are just one element of work-site health promotion programmes, but one that seems to be very important to individuals and organisations alike. As stated by Griffiths (1996), the benefits that the individual employee may experience as a result of taking part in an employee exercise programme are largely considered to benefit the employing organisation, too. In her review on the benefits of employee exercise programmes, she considers four main benefits to employees: the prevention and management of CHD, the prevention and management of other physical disorders (such as cancer of the colon, osteoporosis, and lower back pain), the improvement of psychological well-being, and decreasing work-related stress. However, it is interesting to note that the reviewed literature on the benefits of exercise programmes on the psychological well-being of the individual is almost exclusively focused on non-work related studies. In addition, the majority of research has looked at the impact of employee fitness programmes on more traditional physiological indicators such as improvement in cardiovascular fitness, serum lipid concentrations, strength and endurance (e.g. Dishman, Oldenburg, O'Neal, & Shephard, 1998). Indeed, the role of physical activity in improving work-related well-being of employees has not been widely addressed.

One of the most widely studied mental health outcomes of participation in exercise or fitness programmes for employees is that of stress, a psycho-physiological state. Indeed, stress (and depression) is the second most common reason reported for absenteeism in the workplace (Hodgson, Jones, Elliott, & Osman, 1993). Current theories of stress propose that stress occurs when there is an imbalance between demands (high) and resources (low). Primary appraisal ("Do I have a problem"?) and secondary appraisal ("What can I do about the problem") are proposed to regulate the

perceptions of threat and the choice of coping strategies to be used in a stressful encounter (Lazarus & Folkman, 1984). Evidence suggests that participation in exercise programmes may increase the individual's perceived ability to cope with stress (Gronningsaeter, Hytten, Skauli, Christenson, & Ursin, 1992; Moses, Steptoe, Mathews, & Edwards, 1989). In turn, it is proposed by Cox and Griffiths (1995) that coping resources are influenced by feelings of energy, fatigue, health, and self-esteem, which may in turn be improved through exercise. On this basis, Griffiths (1996) suggests that exercise may *indirectly* influence the individual's perception of the balance between demands and resources, i.e. exercise may affect primary and secondary appraisal. There are suggestions by Albright, King, Taylor, and Haskell (1991) that regular exercise may fuel feelings of mastery, perceptions of control and well-being, which, in turn, may impact positively upon physiological responsivity to stress.

However, it is important to note here, that the concept of stress is uni-dimensional (i.e. high versus low), and therefore may not be representative of an employee's well-being at work. Lazarus (1993) for example, has suggested that distinct emotions are a far richer source of information about how people fare in their lives than the uni-dimensional concept of stress. Therefore, discrete emotions or the dimensional approaches to emotions suggested by Watson and Tellegen (1985) or Russell (1980) may be better indicators of psychological functioning than stress. Indeed, other measures of work-related well-being are sometimes used as indicators of job-related stress (Jex, Spector, Gudanowski, & Newman, 1991).

There is also some research evidence linking participation in employee fitness programmes with direct organizational outcomes, especially in terms of absenteeism (Cox, Shephard, & Corey, 1981; Kerr & Vos, 1993; Tucker, Aldana, & Friedman, 1990). For example, Kerr and Vos (1993) examined the effects of twelve months participation in an employee fitness programme on absenteeism in bankers. The exercise sessions were designed to increase elements of physical fitness, were each one hour long, and took place during work time. Participants were randomly allocated into two experimental (regular and irregular exercisers in the employee fitness programme) and two control groups (exercisers who only engaged in fitness activities outside of the workplace, and non-exercisers). The results revealed that total absenteeism and frequency of absenteeism was reduced for both regular and irregular participants over

the duration of the programme, whereas absenteeism increased for the two control groups over the time period. It is interesting to note that absenteeism increased for those employees who exercised outside the workplace. Therefore, the conclusions of this study could be that the mechanism for the positive change in the control groups was the perceptions of a caring employer induce a higher level of commitment in the employee who takes part rather than improved physical condition.

The effects of employee exercise programmes on measures of productivity or performance have also been carried out, although as mentioned earlier, there is an inherent difficulty in measuring objective productivity. As a consequence, more indirect measures of productivity or performance (e.g. absenteeism and job satisfaction) or some form of perceived productivity or efficiency constructs are often used. Hence, the effects of employee exercise programmes on productivity or performance often use any of these types of measures. An early review by Shephard (1986) supported the use of employee fitness programmes in enhancing feelings of efficiency and in reducing fatigue. A randomised study by Rosenfeld, Tenenbaum, Ruskin, and Halfon (1989) examined the effect of a seven month employee fitness programme (aerobic, strength, and flexibility exercise five times per week before lunchtime for fifteen minutes) on perceptions of efficiency, calculated as perceived efficiency scores. Perceived efficiency was based on perceptions of workload and perceptions of fatigue which were reported throughout the working day. The results indicated that perceived efficiency increased significantly more in the exercise group compared to a social activity group (Rosenfeld et al., 1989).

Other studies have demonstrated some evidence for an association between participation in employee fitness programmes and perceptions of work productivity. For example, in a relatively large-scale cross-sectional study ($N > 1000$ participants), Leutzinger and Blanke (1991) examined the association between membership and adherence to an employee fitness centre, and perceptions of productivity. The findings from this study suggested that membership and adherence to the centre was significantly and positively associated with perceptions of work productivity. In addition, seventy percent of the respondents somewhat agreed that regular exercise would help them to be more productive and feel more relaxed at work. In turn, perceptions of productivity and competence may be important elements of actual

performance as will be discussed later in this chapter (see "Structure of the self-system"). As noted by Leutzinger and Blanke (1991), exercise may impact upon work productivity because of its potential efficacy in increasing work capacity, and decreasing fatigue, stress, and anxiety. Indeed, other research supports the suggested relationship 1) between exercise, mood states, stress and anxiety (Biddle, 2000; Taylor, 2000), and 2) between fatigue, stress, and productivity (Wright & Cropanzano, 1998; Beehr, Jex, Stacy, & Murray, 2000).

Limitations

One of the major criticisms of studies examining the relationship between employee exercise programmes and well-being is the atheoretical nature of much of the research carried out in this area (Sonstroem, 1988). It is imperative that the outcome measures, or the dependent variables chosen, are likely to be influenced by exercise, and are in line with theoretical and/or empirical work. To this end, the relationships between exercise and the measures chosen in this thesis are hypothesised based on theory and empirical findings (see Study 1).

Shephard (1999) has recently proposed some additional limitations of employee exercise programmes, which are important to consider. Firstly, those workers who take part in the exercise at work, he suggests, is that minority of the workforce who are health-conscious. Hence, the average worker with perhaps medium to low levels of health and well-being does not tend to use these facilities. Clearly, there is a great need to consider ways of attracting these employees as they may benefit the most from exercising. Secondly, those who participate in exercise activities at work tend to be those employees who have previously been active in community fitness programmes, and the potential of a further improvement in wellness is minimal for these employees. (Shephard, 1999). Finally, according to Shephard (1999), employees tend to exercise at work with sporadic attention. Indeed, one of the greatest challenges is to encourage adherence to these programmes, as it has been shown that approximately fifty percent of those who start employee exercise programmes drop out within a few months (Shephard, 1996a).

TARGETING

To understand the purpose of targeting employees for exercise and/or wellness interventions, it is important to briefly describe social marketing strategies as they are related to targeting approaches. According to the National Cancer Institute (1995), social marketing technologies are used in the analysis, planning, execution, and evaluation of programmes designed to change the behaviour of a target population to improve their physical and mental well-being. The present thesis is concerned with the first step of this process, the analysis, which involves learning about the feelings and behaviours of the target population. The main aim of social marketing is to effectively tailor programmes to a specific group of people, and the purpose of what is termed "consumer analysis" is to divide the "market" into sub-groups that are homogeneous on certain variables, for example on lifestyle and levels of wellness. This process is called market segmentation (Donovan & Owen, 1994). The use of a targeting (i.e. segmentation) approach allows the programme initiators to meet the needs of the target groups more effectively. Hence, one of the fundamental principles of social marketing is consumer orientation, i.e. determining the needs and wants of a target population, which is said to determine the extent of success of any programme (National Cancer Institute, 1995).

The concept of targeting is central to the present thesis, as one of the goals is to build a foundation on which it is possible to develop effective intervention programmes to improve mental well-being. This process involves the development of typologies of employees, who are relatively homogeneous on well-being and physical activity levels, and different from the profiles of other groups. It is suggested by Griffiths (1996), that specific groups should be targeted in the development of specific motivational strategies. It is argued by Falkenberg (1987) that the image of the organisation as an employer which is concerned with the welfare of its employees is much more likely to be enhanced if the activities are more directly related to the goals of the employees, rather than to the goals of the company. Therefore, it can be argued that it is important to carry out needs analyses with employees prior to the implementation of any health or exercise programmes, which is particularly important with those employees who are not likely to be attracted to the standardised exercise or health programme. The aim of a needs analysis in relation to exercise and wellness programmes is to provide

information of the preferences of a target population regarding elements of a programme, such as types of activities, levels, and times.

In addition, according to Shephard (1999), attendance to programmes may be enhanced by providing what he calls "modular programmes", which are programmes that not only offer exercise, but also advice on other aspects of individual health (e.g. nutrition, stress management, low back problems etc.). Concurrently, the needs of the employees should be assessed based on the resources and possibilities that can be realistically offered by the company. As a consequence of a needs analysis, the individual is provided with some element of choice, and this may enhance the individual's feelings of empowerment, defined as the individual's ability to direct his or her own life (Fahlberg & Fahlberg, 1996) and ownership, which may, in turn, increase adherence rates for the future. Indeed, as stated by Fahlberg and Fahlberg (1996), empowerment theory holds that perceived options, along with contextual factors, partly determines the individual's ability to make and adhere to important choices. It has also been argued that choice and opportunities for self-direction may enhance intrinsic motivation as these promote feelings of autonomy (Ryan & Deci, 2000). Intrinsic motivation, in turn, is associated with adherence, whereas more extrinsically regulated behaviours are related to drop-out from activities (Ryan et al., 1997). In addition, the sporadic interest so often associated with employee exercise programmes may become more consistent if the needs of employee groups are taken into account.

In sum, as stated by Berger and McInman (1993) in a review of literature, in order to enhance adherence to employee exercise programmes, there is a need to make the programmes population-specific, when they argued: "At the present time it seems that the most successful exercise adherence interventions are population-specific. Until additional information is available, programs should be organized around specific individuals, rather than the individuals organized around the exercise program" (p. 751). However, there is a general lack of studies which have carried out exercise interventions which are designed based on targeting principles. It is argued here, that by targeting employees with low levels of well-being and low physical activity, as well as analysing their needs for elements of an exercise or wellness programme, more effective work-site interventions may be carried out.

AN HOLISTIC CONCEPTUALISATION OF EMPLOYEE WELL-BEING AND ITS RELATION TO EXERCISE

Since the 1970s, the research community has come to realise that domains of life interact with one another, and, as a consequence, they should be studied in an integrated manner, as well as within a common framework. To this end, Danna and Griffin (1999) suggested that when examining the construct of well-being for employees the whole person should be taken into consideration, and hence include context-free measures of life experiences (e.g. life satisfaction), generalised job-related experiences (e.g. job satisfaction), and more facet-specific dimensions (e.g. satisfaction with pay). In line with their argument, Hart (1999) argued that research into the well-being of employees should use a holistic approach, as different domains of life "spill over" into one another, and are not segregated aspects of life. As a consequence research studies should look beyond the measurement of work-related variables. Accordingly, such an integrated or holistic approach to well-being was adopted in this series of studies.

Subjective well-being

Definition and components of subjective well-being

According to Diener, Suh, Lucas, and Smith (1999), individuals are not only trying to avoid misery but are also actively seeking happiness. The construct of subjective well-being is one way of assessing elements of that. Subjective well-being is defined as the individual's cognitive and affective evaluations of his or her life (Diener, 2000). It includes the individual's emotional responses (an affective component), domain satisfactions (such as work, self, family etc.) and global life satisfaction (a cognitive component). These affective and cognitive elements of subjective well-being are related, but also distinct (e.g. Andrews & Withey, 1976). The affective component of subjective well-being, with an emphasis on the relationships between physical activity and affect, is reviewed first, followed by a consideration of life satisfaction, its domains and its association with physical activity.

Definitions and correlates of affect, emotion, and mood

The concepts of affect, mood and emotion are often used interchangeably to describe feeling states. However, there are distinctions among them that are important to clarify.

Affect is considered the most general of the terms and is defined by Lazarus (1991) as the subjective experience of emotion. Affect is often used synonymously with mood (Tellegen, 1985), although the time dimension differ between the two. Although simplified as an explanation, affect generally refers to feelings experienced from moment to moment, whereas moods are thought to last longer (Smith & Crabbe, 2000). Emotion and moods are distinguished partly based on their antecedent factors. Events that cause an emotion generally occur quickly, whereas moods are changed by events that occur over a slower time course (Davidson, 1994). Throughout this thesis, the conceptualisation of affect, mood and emotion is consistent with the one reported by Diener et al. (1999), in which affect is believed to be the individual's evaluations of the events that occur in their lives, and mood and emotion can be seen as being those constructs that make up the concept of affect.

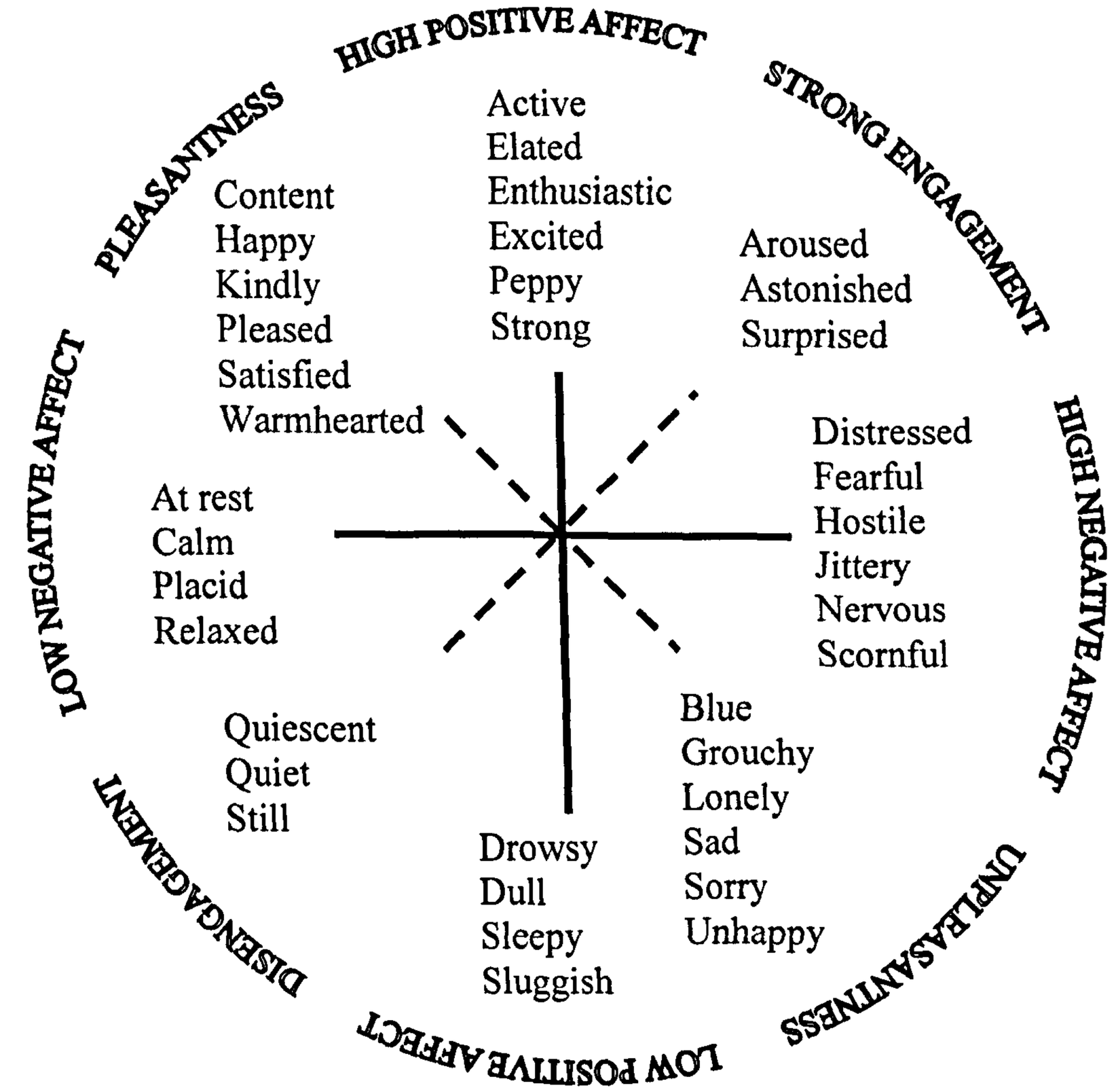
Clearly, affective states serve functional roles, notably in terms of health. Salovey et al. (2000) reviewed some of the mechanisms linking emotional states and health, some of which are reported here. An interesting study by Goldman, Kraemer, and Salovey (1996), for example, showed that individuals who report that they are generally able to regain and maintain positive emotional states are less likely to get sick or to use health-care services when they are faced with a stressful experience. Another mechanism suggested to link affective states and health is the effects of emotional states on psychological resilience (Salovey et al., 2000). For example, Fredrickson (1998) has argued that the primary function of positive emotional states is that they facilitate the availability of personal resources that afford innovation and creativity in thought and action. Finally, health-related behaviours are often used as mood-regulating strategies (Salovey et al., 2000; Thayer, Newman, & McClain, 1994). According to Thayer et al. (1994), the self-regulation of mood involves behaviours modulating energy and tension to optimal levels. The mood regulator therefore seems to activate the individual when needed and deactivate the person when required.

Conceptualisations of affect

There is an on-going debate regarding the conceptualisation of affective experiences; some prefer to view emotions as discrete categories (e.g. Lazarus, 1991), whereas others believe that emotions should be reduced to a few higher-order dimensions (e.g. Watson

& Tellegen, 1985). For example, Lazarus' cognitive-motivational-relational theory of emotion (1991) hypothesise that every emotion is unique as it is created through different appraisals in any specific encounter. However, Watson and Tellegen (1985), maintain that emotions should be defined according to their common properties, positive and negative affect (Watson & Tellegen, 1985). Their claim is substantiated in their findings showing that, using varimax rotation, factor analyses reveal two dominant factors. The first one represents positive affect, or the extent to which the individual feels enthusiastic, active and alert. High levels of positive affect is characterised by full concentration and pleasurable engagement. In contrast low positive affect embody drowsiness, fatigue and lethargy (Watson et al., 1988). The other factor is labelled negative affect and represents the extent to which an individual reports feeling upset or unpleasantly aroused (Watson & Tellegen, 1985). High levels of negative affect reflect feelings such as fear and nervousness, whereas low negative affect represents relaxation and calmness (Watson, Clark, & Tellegen, 1988). Watson and Tellegen's (1985) model of positive and negative affect is presented in Figure 2.3.

Figure 2.3. The two-factor structure of positive and negative affect (modified from Watson & Tellegen, 1985)



In Figure 2.3, positive and negative affect are assessed as two independent variables, where both are depicted on a dimension ranging from low to high. The two ends of the same affect term are negatively correlated whereas the emotions in each adjacent octant are moderately and positively correlated. The octants represented in the model illustrate different combinations of positive and negative affect. In sum, Watson and Tellegen's model is useful to illustrate how different emotions have common properties (e.g. high positive affect and low negative affect).

A number of other conceptualisations of affect have also reported two dominant dimensions of affect (Diener, Larsen, Levine & Emmons, 1985; Russell, 1980). However, a discussion of these is beyond the scope of this chapter. I shall return to the use of a modification of Watson and Tellegen's (1985) model of positive and negative affect in the work setting in the section labelled "Affective states at work".

Affect and physical activity

The studies that have examined the relationship between physical activity and affect are divided into those examining the acute versus the chronic effects of exercise. Indeed, affect is suggested to be the single most responsive emotional construct to exercise (McDonald & Hodgson, 1991). Exercise is often used to regulate mood, i.e. changing bad moods, raising energy levels, and reducing tension. For example, Thayer et al. (1994) compared ten behaviours which are known to be used as mood-regulators, including exercise and nine other behaviours, such as stress management and eating. Their results revealed that exercise was the single best behaviour to perform to change a bad mood, the fourth best at increasing energy, and the third best at reducing tension. In a review of literature by Yeung (1996), including studies with clinical and non-clinical samples using a variety of instruments representing different conceptualisations of mood, the efficacy of one bout of exercise in improving acute mood states was supported. This result points to the efficacy of exercise in the self-regulation of mood. However, there is experimental evidence to suggest that moderate intensity exercise may be superior to vigorous intensity exercise in improving mood, especially for individuals who are not very physically active at baseline (Moses et al., 1989; Parfitt, Markland, & Holmes, 1994; Parfitt, Eston, & Connolly, 1996).

Byrne and Byrne (1993) examined the chronic effects of exercise on negative mood. They found that 90 percent of the studies included in their review supported a positive effect of exercise on mood. In addition they revealed that increased fitness did not necessarily accompany the improvements in mood (Byrne & Byrne, 1993). This finding once again demonstrates that psycho-social factors may, in some circumstances, be more important in explaining the positive effect of exercise on elements of mental well-being.

Recently, Biddle (2000) carried out a review examining the state of knowledge regarding the relationship between exercise and affect. The review largely supported a positive association, where aerobic exercise seemed to have small to moderate effects on several mood indicators, such as tension (-), vigour (+), and fatigue (-). In addition, the experimental studies reviewed seemed to suggest that moderate intensity exercise is effective in enhancing affect. Research seems to indicate that exercise may be more strongly associated with positive, compared to negative, affect (Clark & Watson, 1988; Watson, 1988). Finally, it should be noted that, apart from affect as an important outcome measure, improving affect through exercise may also play an important role in the adherence to exercise (Sallis & Hovell, 1990; Gauvin & Brawley, 1993).

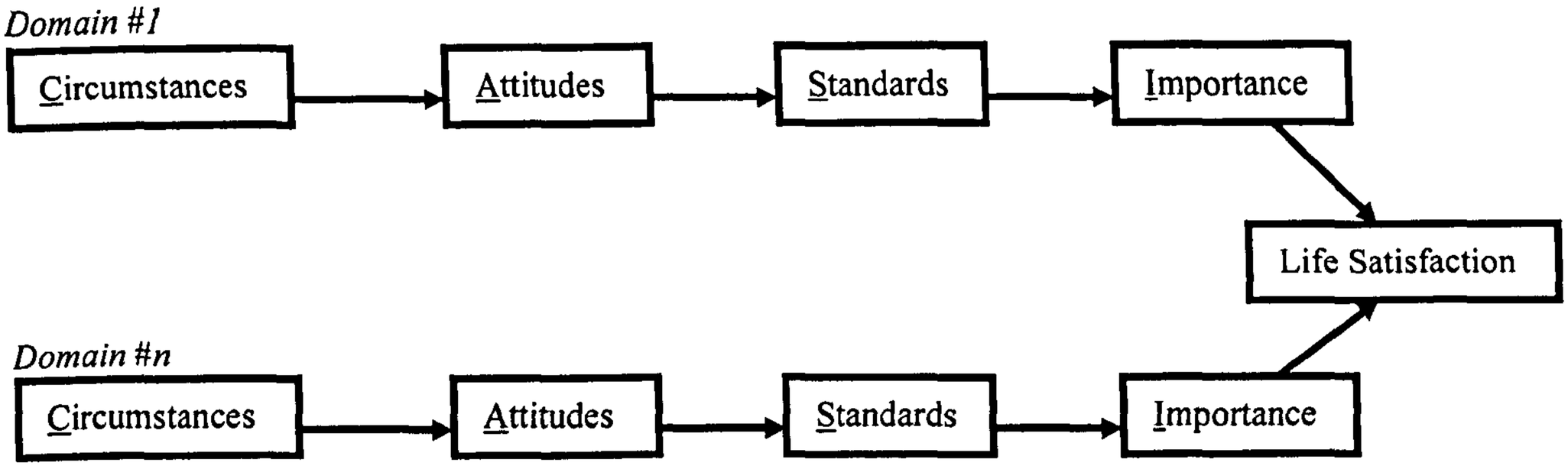
Definition and domains of life satisfaction

Life satisfaction is the cognitive component of subjective well-being, and refers to "a judgmental process, in which individuals assess the quality of their lives on the basis of their own unique set of criteria" (Pavot & Diener, 1993, p. 164). By definition, therefore, life satisfaction is subjective, and does not infer any moral standard. People with high levels of life satisfaction are proposed to be more energetic, more generous, less susceptible to disease, and less sensitive to criticism (e.g. Myers, 1992; Veenhoven, 1989). In addition, a high level of life satisfaction may improve longevity, problem-solving ability, and the ability to find and keep a job (Frisch, 1998).

There is general agreement that life satisfaction, which may be considered the subjective components of quality of life (Cummins, 1997), is a multi-dimensional construct (Cummins, 1997; Frisch, 1999), made up from a number of domains. However, it is also clear that the exact nature of those domains have not been uncovered (Felce & Perry, 1995). In spite of this, there have been recent advances in the

measurement of domains of satisfaction in the quality of life literature (Cummins, 1997; Frisch, 1999). For example, Cummins (1997) has identified seven domains, including health, productivity, and emotional well-being. Frisch (1999) presented sixteen domains, which cover similar areas as those reported by Cummins (1997); such as health, work, and creativity. The means by which each domain is hypothesised to contribute to an overall assessment of life satisfaction is through the interaction of satisfaction of the domain and its importance. In other words, the evaluation of life satisfaction is a subjective evaluation of the extent to which the needs, goals and wishes that are important to the individual have been fulfilled. This reasoning is consistent with telic theories of subjective well-being (see "Theories of subjective well-being"). Frisch (1999) has suggested a linear additive model of life satisfaction, which is presented in Figure 2.4.

Figure 2.4. An additive model of life satisfaction (modified from Frisch, 1999)



It may be seen in Figure 2.4 that the individual's global life satisfaction judgement is based on the sum of satisfaction in various domains of life, which are subjectively valued as important by the individual. According to the model, objective circumstances (e.g. a job promotion) may contribute to the satisfaction of any one domain (e.g. job satisfaction), but are mediated by three factors; the perception of the objective circumstance, i.e. how the reality is interpreted by the individual, by the evaluation of whether the needs and goals relating to that domain of life are met, and the importance or value of the domain. Hence, the potential positive influence of an objective circumstance on domain satisfaction can be relegated by the standards or aspirations the individual hold regarding that domain, if the standards or goals are unrealistically high

(Frisch, 1999). The rationale for the model is consistent with most conceptualisations of life satisfaction (Campbell, Converse, & Rogers, 1976; Diener & Diener, 1995; Michalos, 1991). Indeed, it is important to understand these processes when examining levels of life satisfaction.

Theories of subjective well-being

It is still not clear what causes high levels of subjective well-being. However, research suggest that it may result from working towards goals (Emmons, 1986), close and positive relationships (Baumeister & Leary, 1995; Myers, 2000), experiencing physical pleasures (Scitovsky, 1982), mental pleasures (Kubovy, 1999), involvement in what is termed "flow" activities (Csikzentmihalyi, 1997), and feelings of mastery (Diener, Sapyta & Suh, 1998). Based on these findings a range of theories, or family of theories, have been proposed to explain the causes of subjective well-being. Some of these include bottom-up and top-down theories, telic theories, and discrepancy theories (Diener, 1984; Diener et al., 1999), and the main features of each are briefly described here.

Bottom-up theories postulate that subjective well-being is the sum of the pleasurable experiences one encounters in life, and that the lack thereof, will lead to depression. It does not take into account any personality or trait factors (Diener, 1984). In contrast, the top-down theories propose that happiness is a trait, and reflects the propensity to react in a happy way (Diener, 1984). It has recently been suggested, however, that an integration of these theories may be a more accurate account of the processes involved in the generation of subjective well-being (Brief, Butcher, George, & Link, 1993).

According to telic theories, the individual is consciously or unconsciously seeking happiness, through the pursuit of goals (Diener, 1984). For example, Brunstein (1993) tested the motivational theory of subjective well-being, and found that high levels of goal commitment do not necessarily produce high levels of subjective well-being, but that goal attainability should also be taken into account. This is because those participants with high levels of goal commitment, who struggle with unfavourable conditions to support these goals, demonstrate decreased levels of subjective well-being. Another study found that only progress toward motive-congruent goals, or goals

which are congruent with the individual's fundamental needs, is associated with subjective well-being, whereas motive-incongruent goals such as money, are not (Brunstein, Schultheiss, & Grassman, 1998). These studies illustrate part of the complexity of the relationship between goals and subjective well-being.

Finally, discrepancy theories postulate that subjective well-being results from the comparison between some standard, be it personal or interpersonal, and the actual condition. The most famous theory within this family of theories is Michalos' (1985) multiple discrepancy theory. Here, the individual compares him or herself to a range of standards (past life conditions, other people, aspirations, needs, and goals), and high levels of satisfaction ensue when the comparison standard is lower than the current condition.

The above mentioned theories likely all partly attribute to the generation of subjective well-being, and demonstrate that a whole range of issues should be taken into account to better understand the nature of subjective well-being. It is suggested by Myers and Diener (1995) that some of the most important elements of any future theory on subjective well-being are adaptation, cultural worldview, values and goals.

Explaining the stability of life satisfaction: Adaptation processes, and a homeostatic mechanism

Life satisfaction is generally considered a stable or global construct which is not easily changed. In fact, two studies by Cummins (1995, 1998) found consistent stability in life satisfaction scores across different populations. Cummins (1998) recently suggested that an international standard for life satisfaction may apply for Western as well as some third world countries. This standard is expressed as 70 ± 5 percentage of a scale maximum score. In practical terms, Likert scale responses are converted into a scale ranging from 0 to 100 (Cummins, 1995), and people across countries are generally considered about three quarters satisfied with their lives. These findings suggest that some regulatory mechanisms are taking place when people evaluate their lives. Indeed, several mechanisms have been suggested by different researchers to explain the reason for this homeostasis.

The concept of the "hedonic treadmill" was introduced in the classic work by Brickman and Campbell (1971), which may partly explain the stability of life satisfaction. They propose that people adapt to recent accomplishments because their expectations rise as a consequence of attaining something that will initially make them happy. In contrast, people also seem to adapt to negative experiences, so that after a while a misfortune no longer has a major impact on their level of subjective well-being. Several studies have provided support for this contention (e.g. Suh, Diener, & Fujita, 1996; Stone & Neale, 1984). It is generally acknowledged that adaptation takes place following a positive or a negative life event (Diener, 2000; Cummins, in press). Some additions to Brickman and Campbell's (1971) theory have been suggested in recent years, which build on the explanation for why people may adapt to their circumstances. These include the predisposition of most people to feel more positive, than negative, affect (Cacioppo, Gardner, & Berntson, 1999), temperament influences (Headey & Wearing, 1992), and changing expectancies and goals (Emmons, 1986).

Cummins (in press) has suggested a homeostatic model to explain the high levels of life satisfaction reported by most individuals. He suggests that positive cognitive biases serve as the homeostatic regulation mechanism of life satisfaction. Specifically, the positive cognitive biases for self-worth or self-esteem, control, and optimism are essential. For example, cognitive states can function as a self-enhancement strategy by comparing one's own performance more positively compared to the performance of others (e.g. Tabachnik, Crocker, & Alloy, 1983). Furthermore, positive cognitive biases of control may act as a buffer mechanism against potentially threatening situations, as successful outcomes of behaviour are attributed internally, whereas unfortunate outcomes are disowned. Finally, individuals characterised as being optimists tend to believe that more good things will happen to them than bad, and this sense of optimism is likely to help them to retain high levels of life satisfaction (Cummins & Nistico, 2002).

Physical satisfaction as a domain of life satisfaction?

Perceptions of health have received particular interest in research examining the contributions of domains to life satisfaction. Two different reviews by Diener et al. (1999) and Cummins (1996) concluded that good health is rated as the most important

element when judging the salience of different life domains to life satisfaction. Interestingly, Diener (1984) concluded that subjective measures of health are more highly correlated with subjective well-being than are objective measures of health.

Although the instruments that aim to tap the domains of life satisfaction have all included health as a domain, the present series of studies incorporate a more comprehensive measure of physical satisfaction, as it includes items relating to appearance as well as health. Physical satisfaction, as conceptualised and operationalised in the present series of studies, could be characterised as representing the cognitive components of body image. According to Bane and McAuley (1998), body image is a multi-dimensional construct including perceptual, affective, behavioural, and cognitive elements. Due to its multi-dimensionality, and the various ways body image is measured, Bane and McAuley (1998) suggest that using the term body image may not be specific enough a term to compare across studies. Instead, studies should specify which aspects of body image are being examined.

The salience of the physical self, consisting of physical competencies and attributes as well as body image, may be explained by the fact that our physical bodies function as the 'outer' self (Harter, 1990), which carries with it a range of social images and stigmas (Cash, 1990). Not only do internal feelings about one's feelings about one's appearance greatly influence that individual's level of well-being on a personal level, but the social stigmas attached to appearance-related factors also have strong repercussions for other people's opinions about them, and for social sanctions. For example, a range of negative physical, social, and personal attributes are often ascribed to people who are considered obese (DeJong & Kleck, 1986). Whereas slim individuals are often thought to be fit, attractive, intelligent, and successful, obese individuals are sometimes perceived to be lazy, unattractive, and not in control of themselves (Steiner-Adair, 1987). The stigmas extend into the work setting, too. Research has established that appearance-related factors have implications for discrimination, hiring, and performance evaluation of employees (Cash, 1990). For example, in a study by Cash and Kilcullen (1985) in which two applicants for the same job with equal qualifications where one is perceived to be attractive and the other unattractive, the attractive individual was more likely to be hired.

In view of the above, it is not surprising that some people engage in unhealthy behaviours (such as cosmetic surgery, excessive exercising and excessively restrictive caloric intake), to improve their physical attributes (Davis, 1997). The saying that "you can never be too rich or too thin" (Cash, 1990, p. 64) epitomises the Western's focus on external attributes. Consequently, one aspect of the physical self, appearance attributes, correlate highly with global self-esteem across the life span (Fox, 1999; Harter, 1990). Therefore, it is perhaps not surprising that Elrick (1996) found that a major reason why women are attracted to exercise is improved appearance.

Life satisfaction and physical activity

In spite of the increasing amount of research examining the impact of exercise on mental well-being, there has been relatively little formal research carried out examining the influence of exercise on life satisfaction. In fact, in *1993,* Brown and Frankel concluded that the relationship between physical activity and life satisfaction was as yet unclear. However, the effect of physical activity on a similar construct, health-related quality of life (HRQL), has been reviewed by Rejeski et al. (1996). The main conclusion of their review was that exercise is significantly related to HRQL, despite the amount of different HRQL outcomes measures used and the differences in study designs. As could probably be expected, the review also showed that the degree of change in HRQL through physical activity depend on initial levels of HRQL, as those worse off have more room for improvement. Importantly, however, HRQL does seem to improve to some extent for those with already healthy levels (Rejeski et al., 1996). Finally, Rejeski et al's (1996) study revealed that changes in HRQL as a result of physical activity participation are *not* dependent on increased fitness (Rejeski et al., 1996). This again supports the existence of some undefined psycho-social mechanisms explaining the relationship between exercise and well-being. However, it is important to state that HRQL does refer more to the functional aspect of well-being for patients with various physical disorders, and is used as a measure of treatment efficacy in clinical research. It is therefore conceptually different from the construct of life satisfaction.

Most research examining the relationship between physical activity and life satisfaction has been done with older populations (age 65 and above). Randomised controlled studies and a meta-analysis have generally concluded that exercise

programmes enhance levels of life satisfaction in older adults (e.g. McMurdo & Burnett, 1992; Reifschneider, 1999). Much less work has been done which examines the impact of exercise on life satisfaction in middle-aged adults, and specifically, employees. However, a review by McAuley and Rudolph (1995) concluded that there is support for a positive effect of physical activity on subjective well-being in middle-aged and older adults. In addition, Caspersen et al. (1994) estimated that physical activity is moderately associated with global life satisfaction, but that due to the global nature of life satisfaction, physical activity is probably more highly related to more health-specific outcomes. In a study by Brown and Frankel (1993), which included a relatively large sample size and a wide band of age groups, the findings suggested that physical activity participation is significantly associated with life satisfaction to a small degree. It seems that, although the two constructs correlate, it is likely that the relationship is indirect rather than direct, and that several variables may mediate this association.

To this end, and building on the case for the role of psycho-social mechanisms, a recent study by Rejeski et al. (2001) tried to uncover some of the mediating links between physical activity and subjective well-being. Rejeski et al. (2001) examined the role of satisfaction with physical functioning and appearance in explaining part of the relationship between physical activity and subjective well-being. Indeed, physical activity seems to be play an important role in improving body image and satisfaction (e.g. King, Taylor, Haskell, and DeBusk, 1989), and research has demonstrated positive and significant relationships between physical activity and satisfaction with health (Yarnold, Stille, & Martin, 1995). The results of a study by Reboussin et al. (2000) served as one of the foundations for examining the mediating effects of physical functioning and appearance. The authors found that physical function and appearance are significantly related with components of subjective well-being in older and middle-aged adults. Rejeski et al.'s (2001) study included more than 800 sedentary individuals who took part in a longer-term randomised controlled trial (the Activity Counselling Trial) for which the primary purpose was to assess the efficacy of the intervention to promote physical activity in primary care settings. The results showed that increases in physical activity were positively associated with subjective well-being, and importantly, that satisfaction with physical functioning and appearance served as significant mediators in this relationship. Again, it is worth noting that the positive changes in well-

being as a result of physical activity were not due to changes in fitness status (Rejeski et al., 2001). The methodological rigour and the length of the intervention of this study would seem to provide strong support for a cause-effect relationship between physical activity and subjective well-being, and the efficacy of the physical self in mediating the relationship between physical activity and mental well-being.

The self-system and self-esteem

No psychological phenomenon has been explored as much as the self. It is important here to distinguish the basic dimensions of the self, as they work in different ways to validate who we are. The self-concept, which in effect is a description of the self, refers to a set of identities that are a reflection of the roles we perform (such as mother, employee), and the abilities and traits we believe ourselves to have (e.g. being an exerciser; Fox, 2000). The self-concept is guided by the self-director, which is the active agent of change that enables the self to make choices and initiate action. As everyone wants to feel good about themselves, in healthy people the self director works to promote and present the self in the best possible light, by directing the self to appropriate activities and guides persistence in those activities (Fox, 2000).

Self-esteem, also sometimes referred to as self-worth, may be distinguished from self-concept. Whereas self-concept refers to our own definition of who we are, self-esteem is an indicator of how we feel about who we are (Buckworth & Dishman, 2002), or the degree to which we hold a positive regard of our self as a person (Campbell, 1984). Self-esteem has been characterised as one of the most important indicators of emotional well-being (e.g. Fox, 1998; Leith, 1994). For example, low self-esteem is often implicated in mental illness (Baumeister, 1993), whereas high self-esteem is related to adaptability and resilience to stress (Wylie, 1989). In addition, Rector and Roger (1997) found that self-esteem moderates the relationship between stress and illness, as it influences the appraisal of, and the physiological responsivity to, stress.

Recent theorising on self-perceptions has cast the self as a multidimensional entity that features global and specific elements (Marsh, 1997). It is thought to be the global outcome of self-perceptions in a range of life domains, such as family, work, relationships and physical experiences. Some theorists describe the formation of

specific identities in life domains, such as social and work identities, which combine personal values and perceived competencies. Harter's (1990) model of self-worth for adults, for example, features eleven domains, including perceptions of job competence, intelligence, friendships and physical appearance. The model predicts that the different domains do not contribute equally to the global evaluation of self-esteem, but that the perceived importance of each of them may be thought of as existing in a hierarchical order as a reflection of the values of the individual (Harter, 1990). Importantly, according to Harter's multidimensional model of self-worth, the overall self-evaluation is *not* achieved by combining the domain specific judgements, but by assessing global self-worth directly with an independent set of questions (Harter, 1990). In this way, it is possible to determine the relationship between competencies relating to different domains of life and global self-worth.

The self-system is believed to be organised hierarchically with global self-esteem forming the apex of a pyramid, followed by general domains (e.g. academic, social, and physical), and by increasingly specific elements of each domain (e.g. Shavelson, Hubner, & Stanton, 1976). Hence, the level of abstraction goes from general (at the apex of the pyramid) to specific (the base of the pyramid). It is important to appreciate this structure of the self-system in order to understand how exercise may influence self-esteem (See "Exercise, self-esteem, and the physical self").

Correlates of self-esteem

Evidence suggests that self-esteem is significantly associated with factors pertaining to the individual's life at work and life outside work. For example, a recent study demonstrates that self-esteem display very strong correlations with both job and global life satisfaction (Judge, Locke, Durham, & Kluger, 1998). It is suggested that positive self-esteem may have a positive effect on people's satisfaction because they look upon their lives and jobs more positively, feel more in control, see more variety and challenge in their jobs, and feel more intrinsic worth in their work.

In addition, self-esteem is recognised as one of the most important predictors of behaviour at work (Sullivan, 1989). A meta-analytic study by Judge and Bono (2001) found that self-esteem is one of the best predictors of job satisfaction and job performance. In line with this, research has shown that self-esteem is significantly

correlated with effort as well as quantity and quality of work output (Terborg, Richardson, & Pritchard, 1980). Judge, Erez, and Bono (1998) suggest that positive self-concept is linked to job performance because positive employees are more motivated to perform well in their jobs. Those who have high levels of self-esteem, and by implication high levels of perceived competence in their jobs, may perform better in their jobs, because, as stated by Markus, Cross, and Wurf (1990), perceptions of competence may selectively direct an individual's attention, effort, and energies toward a desired action.

It has also been suggested that people with a high level of self-esteem are less likely to suffer from work-related stress due to more favourable appraisal processes (Berger, 1994). This may be due to the plasticity hypothesis, which posits that individuals with low self-esteem are more easily influenced by external, situational, and transitory situations. As a consequence, they tend to react differently to failure and negative performance feed-back than individuals with high levels of self-esteem (Brockner, 1988). Kernis, Brockner, and Frankel (1989) revealed that one of the reasons why low self-esteem employees are more likely to exhibit adverse affective, cognitive and behavioural reactions to failure and negative feedback, is because they tend to overgeneralise the implications of failure or negative feedback to other aspects of their identities. As a consequence, they are at higher risk of developing somatic complaints in response to job stress. For example, Ganster and Shaubroeck (1991) showed that significant positive relationships existed between role conflicts and somatic health problems for employees with low self-esteem, whereas no significant relationship was found for high self-esteem employees. In contrast, as indicated in a review by Brockner (1988), employees with high levels of self-esteem are more likely to work harder when receiving negative feed-back. The above findings suggest the high relevance of self-esteem to the individual employee as well as to the organisation. Therefore, efforts into finding effective strategies to enhance self-esteem at work should be worthwhile if, indeed, it is changeable.

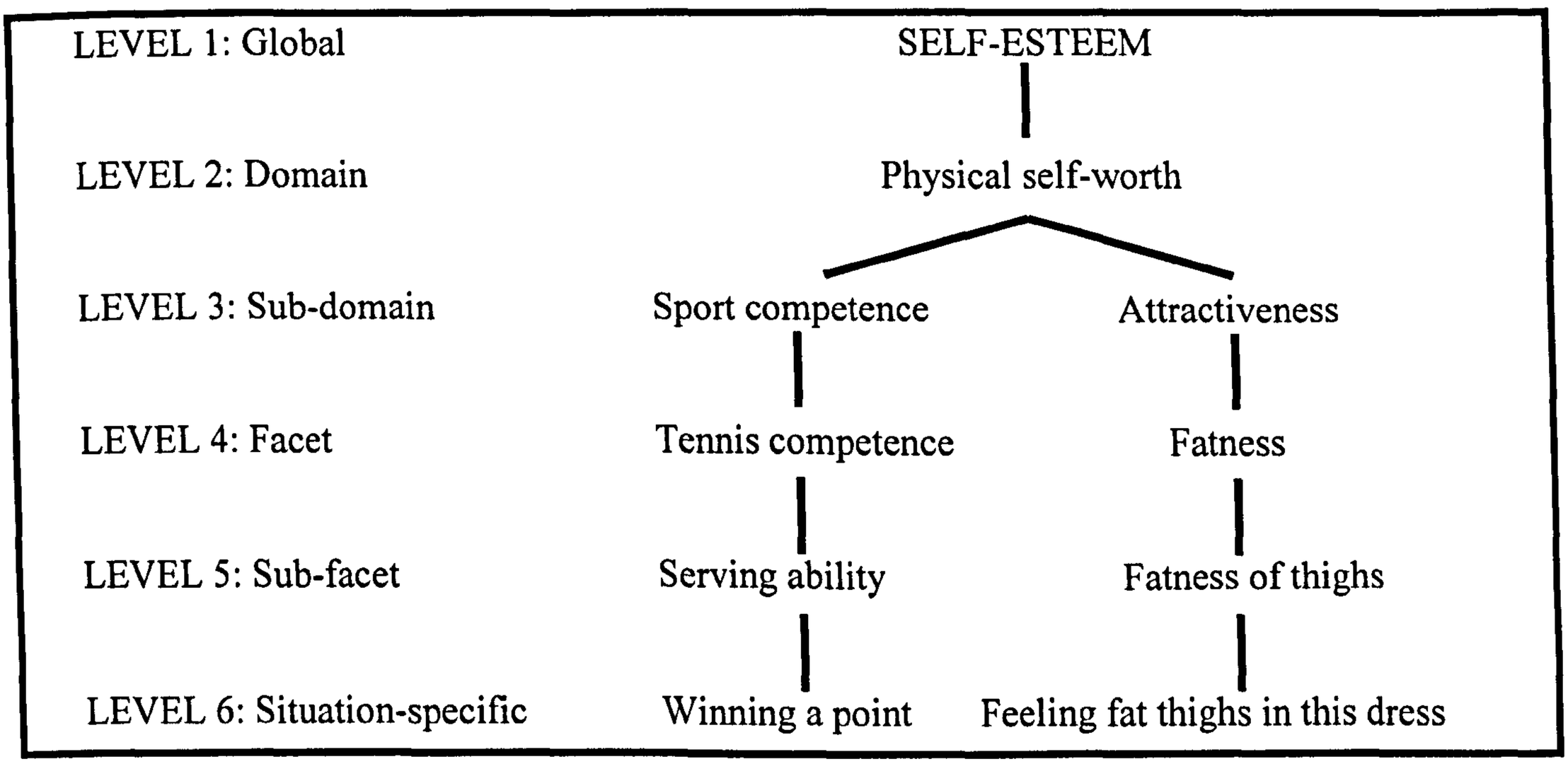
Exercise, self-esteem, and physical self-worth

One of the domains of self-esteem which are pertinent to exercise and well-being, and indeed this thesis, is the physical self, because it may work as one of the mechanisms by

which exercise affects more global indicators of well-being. Its salience seems to arise from its unique property of interfacing the self with the tangible world. To this end it has sometimes been considered as the 'public self' serving as the display board for culturally valued characteristics, and incorporating such well studied constructs as body image and perceptions of physical competence and confidence (Diener, Wolsic, & Fujita, 1995; Fox, 1997).

The physical self is believed to be hierarchically organised with physical self-worth as the global outcome of a range of physical competencies and attributes. The Physical Self-Perception Profile (PSPP; Fox 1990) is one of the most widely used instruments when measuring evaluations of the physical self. As in Harter's model of self-esteem, overall physical self-worth is not made up from the items in the sub-domains, but assessed independently. The hierarchical structure of the physical self and its relation to self-esteem is presented in Figure 2.5.

Figure 2.5. The hierarchical structure of the physical self and its relation to self-esteem (modified from Fox, 1998)



It is seen in Figure 2.5 that the constructs become increasingly specific towards the base of the model (i.e. level 6), and it is hypothesised that behaviours are more directly related to the more specific elements of the model and may generalise upwards to possibly influence global self-esteem. Based on this reasoning, one of the only conceptually coherent models trying to explain how the effects of exercise may

generalise to self-esteem is Sonstroem and Morgan's Exercise and Self-Esteem Model (1989). It is shown in Figure 2.6.

Figure 2.6. The Exercise and Self-Esteem Model (Morgan & Sonstroem, 1989)

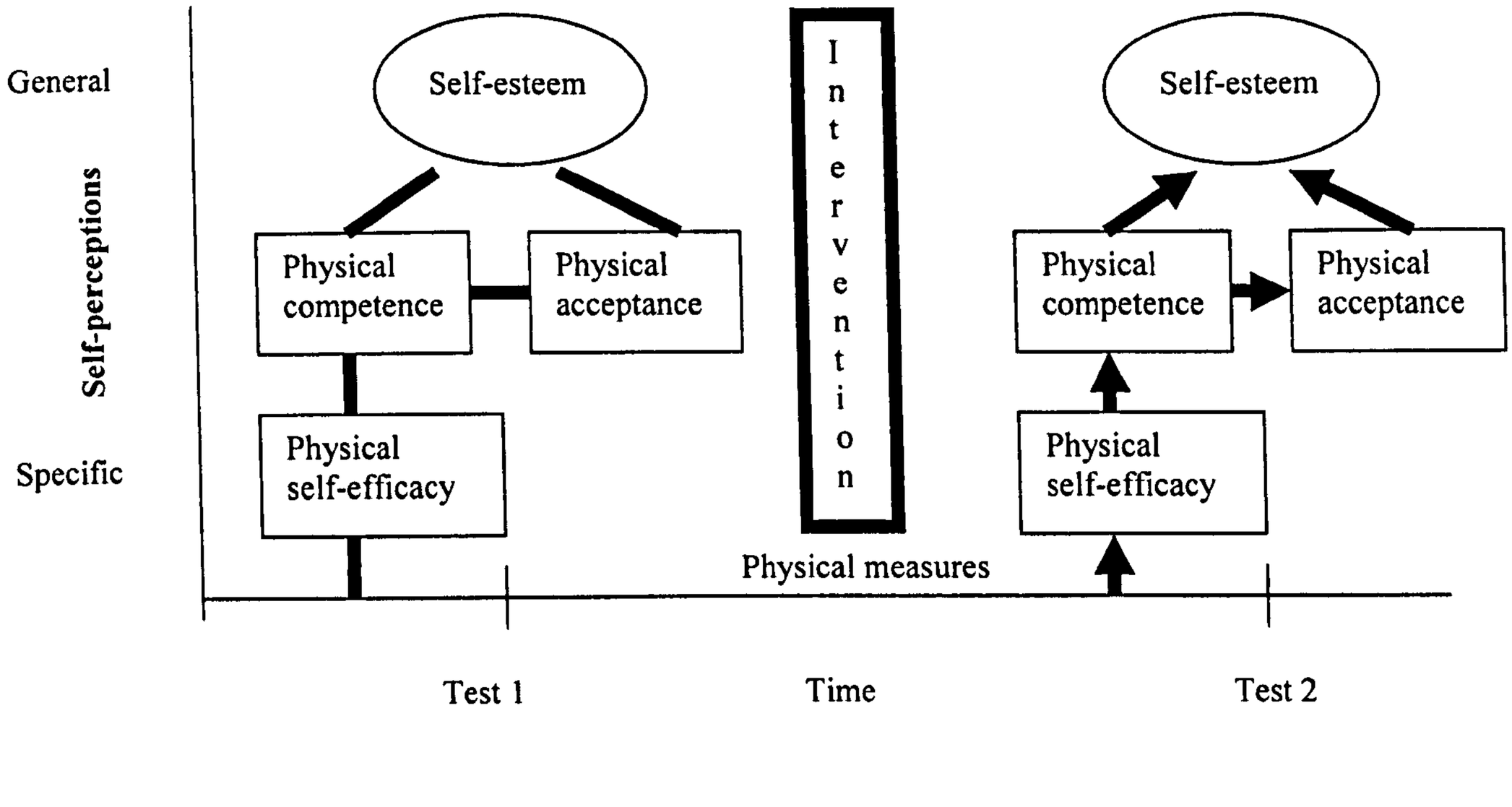


Figure 2.6 shows that physical competence and self-acceptance are the two main foundations that are involved in the creation of positive self-esteem. Self-acceptance refers to the personal regard and liking people hold for themselves irrespective of perceived competence (Sonstroem, 1997), and some may argue that it is therefore similar to the construct of physical satisfaction (Baldwin & Courneya, 1997). However, this is a conceptual debate that will be addressed more thoroughly in the main discussion of this thesis. What remains clear is that, to date, the physical acceptance dimension of the Exercise and Self-Esteem Model has remained largely untested (Sonstroem, 1997).

The vertical axis of Figure 2.6 presents the static hierarchical structure of the constructs. The model hypothesises that physical self-efficacy is more closely related to exercise than is physical competence, and that global self-esteem should display a stronger association with perceptions of physical competence and physical acceptance than with physical self-efficacy. The horizontal axis of the model illustrates how any exercise intervention or programme may enhance feelings of physical self-efficacy, which as stated by Sonstroem (1997) is the "bridge from the physical to representations

of the physical within the mind of the person" (p. 7). Eventually, an accumulation of feelings of efficacy with regard to a specific activity enhance perceptions of physical competence, or the evaluation of the self regarding levels of physical ability (Sonstroem, 1997). In turn, perceptions of physical competence influence global self-esteem. The links between physical competence, physical acceptance and global self-esteem is much less clear. However, as mentioned previously in this chapter, the physical self may represent the "outer self", and is generally considered of great importance, at least in Western populations (Davis, 1997). Research has consistently supported this contention with findings showing high correlations between body image and self-esteem (r = 0.6-0.8) (Fox, 2000; Harter, 1990).

The PSPP (Fox, 1990), which assesses general physical self-worth and four more specific areas of sport competence, physical condition, attractive body, and strength, allowed for the development of the physical competence dimension in the Exercise and Self-Esteem Model into a multi-dimensional construct (Sonstroem, Harlow, & Josephs, 1994). Indeed, Sonstroem et al. (1994) found support for the expanded competence dimension when they demonstrated an acceptable fit of the model to the data compared to alternative models.

The hierarchical structures of self-esteem and the physical self were presented in order to illustrate how the physical self may mediate the relationship between exercise and self-esteem, and thereby shed some light on findings linking exercise and self-esteem, which are presented in the next section. It is argued in this thesis that to establish the effect of exercise on global estimates of well-being, more research is needed which use theoretically based hierarchical models.

The evidence presented here linking exercise and self-esteem is based on reviews of literature that have examined the effects of exercise on physical self-perceptions and self-esteem exclusively, or more general reviews which have included self-esteem as one of the well-being components. The number of reviews on exercise and self-esteem are relatively few, probably due to the limited number of randomised and non-randomised studies which have been carried out.

Fox (2000) recently carried out a review of 37 randomised and 42 non-randomised controlled exercise intervention studies measuring the effect of exercise on physical self-perceptions and/or global self-esteem. Despite the variety of outcome

variables measured and different instrumentation used, of which some are not based on multi-dimensional and hierarchical models of self-esteem, approximately 80 percent of the studies reviewed illustrated significant changes in aspects of the physical self, and approximately 50 percent of the studies included showed significant changes in global self-esteem as a result of exercise programmes. Previous reviews have supported these findings (Leith, 1994; Sonstroem, 1984). According to the review by Fox (2000), the greatest benefits of exercise programmes seem to be for those who have initially low levels of self-esteem. This makes sense, as they have more room for improvement. The results of the review also showed that both aerobic exercise and resistance training may be beneficial, although resistance training seems to be more effective in the short term. In short, there is some evidence to suggest a causal relationship between exercise participation and self-esteem, but there is stronger evidence for changes in physical self-worth than for global self-esteem. It is important to note here that, as suggested by Fox (2000), the fact that self-esteem may only be enhanced through exercise in approximately fifty percent of cases again disputes the existence of any generic psycho-physiological or psycho-biochemical mechanism which applies to all individuals.

However, recent evidence suggests that changes in global self-esteem may not be necessary to improve well-being. Research has revealed that physical self-perceptions, and notably physical self-worth, is weakly to moderately related to favourable life adjustment variables, including positive affect, independent of global self-esteem and socially desirable responding (Sonstroem & Potts, 1996; Van de Vliet et al., 2002). Specifically Sonstroem and Potts (1996) found that those individuals who score high on physical concepts are enthusiastic, alert, and active, as well as relatively free from distress, neuroticism, and depression (Sonstroem & Potts, 1996). If indeed physical self-worth has similar well-being properties to global self-esteem, this is significant for research looking into the effects of exercise on well-being, as behaviours are more likely to change more specific elements of self-perceptions compared to global ones (Biddle, 1995). The above results are in contrast to Harter's (1990) competence motivation theory which predicts that global self-esteem fully mediates the relationship between domains of self-concept and emotions. As yet, however, whether this finding extends into the work setting has not been examined.

Job satisfaction

Definition, conceptualisation, and stability of job satisfaction

There are probably two main reasons why job satisfaction is one of the most widely studied constructs in organisational psychology. First of all, it is generally acknowledged to be an important indicator of well-being, which is probably because of the spill-over effects from work to life satisfaction (see "correlates of job satisfaction"), and because people tend to spend at least one third of their time at work. Secondly, as will be shown below ("see correlates of job satisfaction"), job satisfaction has important implications for the organisation, too.

Currently, there is some debate regarding the nature of job satisfaction. An early definition of job satisfaction by Locke (1969) stated that job satisfaction is the function of the perceived relationship between what the individual wants from his or her job and what he or she believes that the job offers. In line with this, Hulin, Roznowski, and Hachiya (1985) proposed that job satisfaction is a function of the balance between what the individual puts into the work role (i.e. work role inputs, such as education), and what the individual perceives to receive through the job (i.e. work role outcomes, such as pay). In these two examples, the definitions of job satisfaction are cognitively oriented. However, job satisfaction is considered by many as an attitude, which is defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1993, p. 1). The definition of evaluation, in turn, includes cognitive, affective, and behavioural elements. More recent definitions of job satisfaction, therefore, have taken into account both the cognitive and affective components. For example, Brief (1998) defines it as "an internal state that is expressed by affectively and/or cognitively evaluating an experienced job with some degree of favor or disfavor" (p. 86). As stated by Brief and Weiss (2002), debates pertaining to job satisfaction as an evaluative judgement or as constituting an affective component are both valid (and may not necessarily be in conflict), however, it is important to explicitly state which theoretical approach is adopted. In the present thesis, job satisfaction is an evaluative judgement, where affect at work is seen as an antecedent to, rather than as an indicator of, job satisfaction (Brief & Weiss, 2002; Weiss & Cropanzano, 1996). Indeed, empirical support exists for this argument (Weiss, Nicholas, & Daus, 1999; Fisher, 2000; Kelloway, Barling, & Shah, 1993).

Job satisfaction is often said to be determined by the intrinsic aspects of the job, including skill variety, task identity, task significance, autonomy, and feed-back (Hackman & Oldham, 1976). In addition, situational circumstances may also determine levels of job satisfaction whereas determinants of job dissatisfaction include opportunities for jobs outside the organisation, role ambiguity, role conflict and role overload (Agho, Mueller, & Price, 1993). Similarly, according to the investment model of job commitment by Rusbult and Farrell (1983), job satisfaction is viewed as the function of the employee's subjective estimate of the rewards that the job provides (e.g. sense of autonomy, pay and job security) relative to its costs (e.g. role ambiguity and work overload). Therefore, the model predicts that job satisfaction is enhanced along with an increase in rewards and a decrease in costs (Rusbult & Farrell, 1983). Furthermore, Locke (1995) has suggested that job satisfaction may also depend on how job tasks fit the individual's longer term goals, and the extent to which self-esteem is dependent on their job.

One of the most prominent debates regarding the nature of job satisfaction is the extent to which it is also determined by affective disposition, and may be viewed as a result of genetic pre-disposition (Arvey, Bouchard, Segal, & Abraham, 1989; Staw, Bell, & Clausen, 1986) or the extent to which it is changeable over time. Indeed, global job satisfaction is generally considered a relatively stable construct, and may be said to be the global indicator of work-related well-being. Although the findings of Arvey et al. (1989) and Staw and Ross (1985) suggest that efforts to change situational circumstances in the workplace to increase job satisfaction may be redundant given the strong effect of affective disposition, Gerhart (1987) has challenged Staw and Ross' study on methodological and conceptual grounds. For example, the use of a relatively old sample (45 years and above) of men did not seem representative of the working population. Using a large sample size of notably younger individuals in a three-year longitudinal study, Gerhart (1987) found that situational characteristics of the job did predict job satisfaction when controlling for earlier levels of job satisfaction. A meta-analysis by Connolly and Viswesvaran (2000) supported an interactional approach to job satisfaction when they found that ten to twenty percent of the variance in job satisfaction could be attributed to individual differences in affectivity. However, an even more recent meta-analysis carried out by Dormann and Zapf (2001) examining the

stability of job satisfaction concludes that dispositions do not have as big a direct effect on levels of job satisfaction as previously thought, but that dispositions may affect job satisfaction indirectly through selection processes. In other words, dispositions may affect job conditions, which may in turn impact on levels of job satisfaction. Dormann and Zapf (2001) argue that these personality effects "do not question the usability of job satisfaction for the subjective assessment of the organization" (p. 498). In sum, although there is evidence to suggest that dispositions play a role in judgements of job satisfaction, the role of situational circumstances should not be ignored.

Correlates of job satisfaction

The notion that job satisfaction is an important indicator of level of adjustment at the level of job and well-being in general is supported by several findings:

1. *Job satisfaction is significantly associated with life satisfaction*: Most studies have shown that the relationship between job and life satisfaction is reciprocal (Judge & Hulin, 1993; Judge & Watanabe, 1993). However, as argued by Lance, Lautenschlager, Sloan, and Varca (1989), this conclusion may be too simplistic. Indeed, Lance et al. (1989) have argued that differences in domain scope (i.e. how many entities the domain encompasses), criticality (i.e. whether substitutes are available), and centrality (i.e. the overall importance to the individual) of domains of life satisfaction may determine the direction of the relationship between global and life facet satisfaction. Therefore, it seems reasonable to suggest that, to some extent, the relationship between life and job satisfaction should be considered in a person-situation interactional perspective. Judge, Boudreau and Betz (1994), for example, found that the effect of job satisfaction on life satisfaction was significantly stronger than the effect of life satisfaction on job satisfaction for male executives. It seems that for those individuals for whom the job is central to their identities ("living to work"), job satisfaction may have a larger impact on life satisfaction, than for those for whom the job is less important ("working to live").
2. *Job satisfaction predicts physical and mental health*: Romney and Evans (1996) carried out a study with the general population testing two models: one in which physical and mental health predicted job satisfaction (and other

health-related quality of life constructs, incl. friendships), and one where job satisfaction influenced physical and mental health. The data were mostly supportive of the latter model. Based on these findings, Romney and Evans (1996) suggested that job satisfaction may be important for the maintenance of health and the prevention of illness.

3. *Job satisfaction is significantly related to early retirement*: A seven year longitudinal study with British civil servants revealed that employees with low levels of job satisfaction were significantly more likely to take early retirement from their jobs (Mein et al., 2000).
4. *Job satisfaction may predict levels of job performance*: A meta-analysis examining the nature of the relationship between job satisfaction and job performance was recently carried out by Judge, Thoresen, Bono, and Patton (2001). The study found support for a significant effect (ES=.30) of job satisfaction on job performance. In addition, due to the difficulties with measuring job performance, especially in white-collar jobs (Kirkcaldy et al., 1994), job satisfaction is sometimes used as an indirect measure of work productivity (e.g. BarriosChoplin, McCraty, & Cryer, 1997).

Physical activity and job satisfaction

Relatively few studies have examined the relationship between exercise and job satisfaction. The studies that have been carried out generally support a positive and significant relationship between exercise and job satisfaction (Daley & Parfitt, 1996; Jex, et al., 1991; Kirkcaldy et al., 1994; Pak, Olsen, & Mahoney, 1999-2000; Siu, Cooper, & Leung, 2000). Interestingly, a study by Peterson and Dunnagan (1998) found that University employees who engaged in regular aerobic exercise had significantly higher levels of job satisfaction than those who did not do any regular aerobic exercise, despite the absence of a significant relationship between an overall health promotion programme and levels of job satisfaction. Not all evidence, however, point to a positive association between exercise and levels of job satisfaction. For example, a review by Shephard (1996b) found that employees taking part in work-site exercise programmes report that they "feel better", however, job and life satisfaction are not necessarily enhanced as a result. In addition, a quasi-experimental study (no control group) with

employees carried out by Altchiler and Motta (1994) examined the effect of an eight week exercise programmes on mental health and job satisfaction, with participants engaging in either aerobic or nonaerobic exercise classes. Although trait anxiety reduced in those aerobic exercisers who had not exercised before the programme, there were no significant changes in job satisfaction for either group. However, there is one important point to make regarding the time-frame of the study by Altchiler and Motta (1994). As mentioned above, the construct of job satisfaction is a relatively global indicator of well-being in the workplace, which means that changes are not likely to take place over short periods of time. It is therefore likely that an eight week programme is not long enough to induce any changes in job satisfaction.

It is also important to note the way in which different studies have measured the construct of job satisfaction. Whereas most studies examining the relationship between exercise and job satisfaction use global indicators of job satisfaction, the study by Kirkcaldy et al. (1994) examined this association using *domains* of job satisfaction (e.g. relationships with other people at work, degree to which the individual is motivated by the job, and kinds of tasks the individual has to perform at work). There is no direct explanation why exercise would relate to some of the domains of job satisfaction, such as satisfaction with the tasks performed at work, however, it is suggested in the study by Kirkcaldy et al. (1994), that the relationships among colleagues may develop due to the improved camaraderie associated with membership of sport teams. In addition, Taylor (2000) suggests that exercise per se may only weakly relate to job satisfaction, but that the significant relationship between exercise and job satisfaction may be more a reflection of the individual's satisfaction with the company's investment in employee well-being. Hence, it can be argued that the relationship between exercise and job satisfaction may be indirect, although the mediators in this relationship have not been established.

Affective states at work

Affective states at work refer to the existence of positive and negative affective states *while at work* over a certain time period. It is important here to distinguish it from the affective component of job satisfaction, as this refers to affective reactions *towards* some aspect of work. As argued by George and Brief (1992), although mood at work

(conceptualised as affective experiences encountered at work) and job satisfaction are not completely independent, they are conceptually distinct and non overlapping to the extent that they should be considered distinct constructs and investigated on their own (George, 1989; Isen & Baron, 1991). Recently, Fisher (2000) found support for this contention.

Conceptualisation of affect at work

As mentioned previously in this chapter, Watson and Tellegen's (1985) bi-polar model of affect has been modified into a construct measuring affect at work. Brief, Burke, George, Robinson, and Webster (1988) developed the Job Affect Scale (JAS) to measure affect at work during the past week using Watson and Tellegen's (1985) indicators of positive and negative affect. In 1989, Burke, George, Brief, Roberson, and Webster examined the factor structure of JAS testing the two-factor structure of positive and negative affect against a multi-factor model using confirmatory factor analysis with three different samples representing a range of occupations. The motivation for testing the multi-factor structure of work-related affect was based on an exploratory factor analysis of the JAS in the initial study by Brief et al. (1988), for which the results were not published, which located five unrotated common factors that had Eigenvalues greater than or equal to 1 (Burke et al., 1989). However, when defining the competing multi-factor structure of job affect, Burke et al. (1989) adopted a four-factor structure of job affect, and not five, based on conceptual considerations. The hypothesised four factors were assumed to represent states of psycho-physiological arousal or activation. The four factors hypothesised are similar to the initial model of affect proposed by Thayer (1986), which includes general activation (energy), deactivation-sleep (tiredness), high activation (tension), and general deactivation (calmness). However, more recently Thayer (e.g. 1989) has favoured viewing these four factors of affect as poles of two dimensions (energetic arousal and tense arousal). Indeed, the confirmatory factor analytic results by Burke et al. (1989) showed that the two-factor (bi-polar) structure of positive and negative affect did not fit the data very well. In contrast, the four-factor model illustrated a significantly better fit to the data. The authors concluded that affect at work should be measured as four descriptively unipolar factors (positive arousal=enthusiasm, negative activation=nervousness, low arousal=fatigue, and low

activation=relaxation; Burke et al., 1989). As stated by Burke et al. (1989), the four factors may provide greater explanatory power than the bi-polar factor structure in models aiming to establish causal directions between affect at work and some other theoretically specified variables. Consequently, this conceptualisation of work-related affect was adopted in this series of studies.

Correlates of affect at work

The importance of including job affect in a study examining the well-being of corporate employees should be seen in light of the following important research findings:

1. *Positive affect at work is significantly related to job performance*: Rust (1999) found that positive affect at work is significantly associated with job performance, measured as supervisor ratings (Rust, 1999). In addition, a review of literature by Cote (1999) found strong support for the role of affect in enhancing job performance. Specifically, it was shown that affect is a better predictor of job performance than job satisfaction, and that both long-term and short-term performance can be predicted by affect (Cote, 1999). Finally, in a series of studies, Staw and colleagues (Staw & Barsade, 1993; Staw, Sutton, & Pelled, 1994; Wright & Staw, 1999) have convincingly demonstrated that positive affect at work is a facilitator of performance at work.
2. *Positive affect at work is positively related to pro-social behaviour*: Research studies have demonstrated that positive affect at work may promote the display of pro-social, or helping, behaviours at work (George, 1991; George & Brief, 1992; Isen & Baron, 1991). This, in itself, produce co-operation which clearly has positive implications for work productivity, including better customer service for example (George, 1991).
3. *Affect at work is significantly related to absenteeism and turnover intentions*: A recent longitudinal study by Pelled and Xin (1999) demonstrated that affective states at work significantly predict levels of absenteeism. Positive affect at work also seems to be playing an important role in turnover intentions. For example, George and Jones (1996) found that employees with low levels of job satisfaction were less likely to think about quitting their jobs if they had high levels of positive affect.

4. *Positive affect at work is significantly associated with, and may predict, levels of job satisfaction*: Positive affect at work is one of the main predictors of job satisfaction, independently of the employee's disposition to be happy (Fisher, 2000; Judge et al., 1998; Kelloway et al., 1993; Weiss et al., 1999).

Job affect and physical activity

Clearly, a lot of factors may predict the individual's affective experiences at the job. Why may exercise or physical activity play a role in generating improved affect at work? Here it is important to mention once again, that affect at work refers *not* to affective reactions towards some aspect of the work environment, but to feeling *while at work*. Hence, the rationale for any link between exercise and affect at work comes from an appreciation of the efficacy of exercise in inducing positive affective states in general (Biddle, 2000). If exercise produces positive affective states, one would assume that this also generalise to feelings while at work. To my knowledge, as yet, no study has examined the relationship between exercise participation and affective states while at work, however, there is evidence to suggest that participation in employee exercise programmes is significantly associated with enhanced mood, which is measured using general affect instruments (Daley & Parfitt, 1996; Groenningsaeter, Christensen, Larsen, & Ursin, 1991; Sidney & Jette, 1987). In addition, as mentioned in the section on job satisfaction, positive affect at work is theorised, by many, to be an antecedent to job satisfaction (Brief & Weiss, 2002; Weiss & Cropanzano, 1996; Weiss et al., 1999). Therefore, positive affect at work seems a likely contender as a mediating variable linking exercise and job satisfaction.

RESEARCH QUESTIONS EXAMINED

The main purpose of this thesis is to enhance understanding of how employees may be targeted for effective exercise and wellness programmes in the workplace. Based on previous suggestions (Berger & McInman, 1993; Shephard, 1999), it is expected that a targeted approach, based on theoretically relevant constructs of well-being and physical activity, should provide for more effective interventions based in the work setting. In order to target populations at risk, the possibility of developing meaningful well-being typologies need to be explored. These should be constructed based on a coherent

theoretical framework, in line with Danna and Griffin's (1999) suggestion. Incorporating physical activity and exercise into well-being typologies firstly requires the knowledge of how physical activity is related to the well-being constructs of interest.

Due to the general paucity of research examining the relationship between physical activity and well-being of employees, the aim of the first study was to examine the interrelationships between general exercise participation and constructs of well-being in a sample of corporate employees. Using Structural Equation Modelling (SEM), the direct and indirect paths between exercise and three components of well-being (physical, work-related, and global), which were assumed to be hierarchically organised (in line with Morgan and Sonstroem's (1989) Exercise and Self-Esteem Model), could be specified and analysed simultaneously. The model also allowed for an investigation into potential mediating mechanisms linking exercise with well-being. In addition, multivariate analyses of variance were adopted to examine differences in well-being between general physical activity quartiles (based on self-reported frequency, intensity and duration) in order to examine further the nature of the relationship between physical activity and the three well-being components.

In the second study, there was scope to develop typologies from the same data set as in Study 1 based on physical activity and well-being using hierarchical cluster analysis. Examining the existence of typologies not only provides information with regard to differences in well-being and physical activity status between different groups, but also adds knowledge to the understanding of the multi-dimensional relationships between physical activity and mental well-being (Hair, Anderson, Tatham, & Black, 1998). If multi-dimensional relationships exist, one can infer that, for some people, physical activity may not work to enhance well-being, whereas for others, physical activity and well-being may be closely associated. Moreover, the examination of these typologies allows for the identification of employees who may benefit from interventions to enhance well-being. The typologies established are also subjected to a statistical validation process, and described in terms of gender and job title distribution.

Following on from the results of the cluster analysis, a separate qualitative study (Study 3) was carried out to provide confirmatory material to the cluster solution from Study 2. Ten semi-structured interviews were carried out, with at least two

representatives from each cluster group, in order to extend the meaning of the clusters. This study also allowed for an examination of the determinants and consequences of cluster membership. The more in-depth information provided by each of the interviewees may enhance understanding of some of the processes of change in well-being, and was used to examine how well-being and exercise relate within the individual.

The fourth study had several aims. First of all, the study aimed to test several of the findings from Study 3, and hence, provide some generalisability to the findings using a representative sample of secretarial and administrative University employees. In this study, physical activity was examined based on overall types of physical activity rather than total energy expenditure. These groups were subsequently compared on measures of well-being to explore whether any differences existed in any of the well-being components. Furthermore, consistent with proposals of SDT (Deci & Ryan, 1985), multiple hierarchical regression analyses were carried out to test the hypothesis that intrinsic motivation to exercise (structured exercise and sports only) is a significantly better predictor of measures of well-being compared to controlled forms of motivation.

The main aim of the final study was to establish well-being typologies in non-exercising University administrative employees. The study would allow for an identification of those non-exercising groups who are in greatest need of enhancing context-free and/or context-specific well-being. Consequently, these are the groups which future intervention studies should aim to target. An added feature in this study is the inclusion in the typologies of the variable of amotivation to exercise, which may play an informative role in identifying those who are likely to be attracted to a future exercise programme in a new University Sport, Exercise and Health centre being established at the University of Bristol. Along with the typologies, a needs analysis was carried out which incorporates options for more modular programmes (i.e. not only options for exercise programmes but also advice on other aspects of health) in the new Centre, which as suggested by Shephard (1999), may promote attendance to such programmes. The clusters were described along these needs, and with a view on promoting exercise and well-being in the workplace, the analyses may facilitate more effective exercise and wellness interventions.

CHAPTER THREE

STUDY ONE: THE RELATIONSHIP BETWEEN EXERCISE AND THREE COMPONENTS OF MENTAL WELL-BEING IN CORPORATE EMPLOYEES

As discussed in Chapter 2, the interrelationships between context-free and context-specific elements of well-being should be considered when examining the mental well-being of corporate employees (Danna & Griffin, 1999). Consequently, this conceptualisation was adopted in the first study. In addition, limited research exists that has examined the relationship between exercise and mental well-being in a corporate population. The paucity of theoretically based research examining these complex set of relationships using advanced statistical analyses, suggests a need for further research. To this end, the first study in this series of research aimed to build on existing literature indicating that the physical self and positive affective states at work provide important links between exercise participation and more global indicators of mental well-being.

Chapter 2 identified the mental well-being constructs that have theoretical as well as practical significance for a study of this nature. Specifically, the three components of well-being included in this study are physical well-being, work-related well-being, and global well-being. The model of exercise and well-being proposed in this model is based on the reasoning that exercise may be both directly and indirectly linked to well-being constructs depending on the specificity of the construct. Research into the effects of exercise on self-esteem has inspired the conceptualisation of the present model (Sonstroem & Morgan, 1989; Sonstroem et al., 1994).

Recent conceptualisations of self-esteem describe it as a multi-dimensional and hierarchically structured construct, consisting of global as well as specific elements (Marsh, 1997), such as work, social relationships and physical experiences. This line of theorising may likely advance our understanding of how exercise works to influence more stable constructs of well-being. For example, Sonstroem and Morgan's (1989) Exercise and Self-Esteem Model is built on the principle of a hierarchically constructed self, in which exercise may generalise to global self-esteem through a range of mediating variables such as perceptions of physical competencies and attributes. Indeed, this model has received empirical support in several studies (e.g. Baldwin & Courneya, 1997; Sonstroem et al., 1994). In addition, a recent review of 36 randomised controlled trials indicated that a range of sport and exercise interventions had been successful in improving physical self-perceptions and, in some cases, this had generalised to global self-esteem or self-concept (Fox, 2000). This evidence supports Sonstroem and Morgan's Exercise and Self-Esteem Model (Sonstroem & Morgan, 1989).

In contrast to the amount of research examining the effect of exercise on self-esteem, much less attention has been paid to the effect of exercise on life satisfaction. Evidence is now accumulating, however, that exercise does indeed have a positive effect on life satisfaction, especially in older adults (Caspersen et al., 1994; Mihalko, McAuley, & Bane, 1996). However, only recently has research started to examine why this may be the case. A large-scale two-year randomised controlled trial in the United States, which found that physical activity is significantly related to subjective well-being, has found strong support for the mediating influences of satisfaction with physical function and physical appearance (Rejeski et al., 2001). The important finding by Rejeski et al. (2001) does indeed provide some support for the important role of the physical self in explaining the effects of exercise on life satisfaction. Indeed, numerous studies have found support for the positive effect of exercise on measures of health and appearance (King et al., 1989; Yarnold et al., 1995).

In view of the above, one of the theoretical assumptions taken in the present study is that the well-being constructs are hierarchically organised with specific constructs placed at lower levels, and global components placed at higher levels. Following on, this would suggest that exercise participation is more closely related to situation-specific rather than global constructs of well-being.

Another well-being construct that is reported to be one of the most responsive to exercise is affect (McDonald & Hodgson, 1991). A recent systematic review of literature (Biddle, 2000) found that physical activity is consistently related to positive affect. Although the research has yet to determine the causality of the link, experimental trials do suggest that moderate intensity exercise has a positive effect on affect and mood (Biddle, 2000). As discussed in Chapter 2, affect is also receiving increased research attention in the organisational literature, given its close association with important indicators of organisational effectiveness, such as absenteeism (Pelled & Xin, 1999) and performance (Cote, 1999). Positive affect is also acknowledged as one of the main predictors of job satisfaction, independent of dispositional happiness (Judge, Locke, Durham, & Kluger, 1998; Weiss et al., 1999). Although there is some evidence for a direct relationship between exercise and job satisfaction (e.g. Norvell & Belles, 1993), this evidence is at best equivocal, lacks a theoretical framework, and requires further attention. Consequently, it is hypothesised that exercise participation is linked to

job satisfaction through positive affect at work, a hypothesis that has not been addressed in previous research.

Interrelationships between well-being constructs are also tested in the present research. The model predicts that job satisfaction may "spill over" into other judgements of life experience, due to the high importance attached to the job for many people (e.g. Judge & Watanabe, 1993). In addition, discussed in Chapter 2 was the possibility that physical self-worth carries mental well-being properties in its own right, regardless of the mediating influence of global self-esteem. Consequently, a partial correlation analysis was carried out to test this assumption in a separate analysis. The result of this analysis determined the inclusion of a direct path between physical self-worth and positive affect at work in the model.

Although only exercise participation was included as a measure of physical activity in the model, analyses of variance were carried out examining the differences between participants on well-being constructs with total physical activity as the dependent variable. It may be argued that to the extent that these analyses support each other, the case for exercise in the mental health promotion of corporate employees may be stronger.

In brief, the main purpose of this research was to establish a preliminary model of the relationships among indicators of a) exercise participation, b) the physical self, c) work-related well-being, and d) global well-being. First, it was hypothesised that those employees involved in higher levels of physical activity have higher physical self-worth, work-related well-being, and global well-being compared to those involved in less physical activity. Second, a preliminary model was developed to provide a future framework for the investigation of potential mechanisms that may underpin the influence of exercise participation on well-being. The model hypothesises that exercise is significantly related to physical self-worth, physical satisfaction and enthusiasm at work. In turn, the model stipulates that exercise participation will influence or generalise to global and work specific indicators of mental well-being through physical self-worth, physical satisfaction, and enthusiasm at work. The model further hypothesises that a direct significant path exists between physical self-worth and enthusiasm at work, and that physical satisfaction is influenced by perceptions of the physical self, based on assumptions from the Exercise and Self-Esteem Model

(Sonstroem & Morgan, 1989) and empirical findings (Pliner, Chaiken, & Flett, 1990). Finally, it was hypothesised that job satisfaction will "spill over" into global judgements of life satisfaction.

METHODS

Participants and procedures

A multi-questionnaire pack was transferred to the world-wide-web. One of the reasons for using the world-wide-web was that the target population worked in the area of computers, and therefore it was assumed that this approach would be appropriate. The other reason was based on financial considerations; because the questionnaire was web-based all employees at the site had the possibility to take part in the study, whereas it would not be financially possible to distribute hard-copy questionnaires to everyone.

Prior to conducting the main study, the web-based questionnaire pack was piloted on a small sample of employees from a multi-national information technology company (N=15). They were requested to comment on the lay-out of the questionnaire, and make any suggestions that might help to improve this lay-out to make it easier to understand. They were also asked to comment on how long it took them to fill in the questionnaire. These suggestions helped me to establish more user-friendly web-pages. Slight changes were subsequently made to the web-pages.

Then, an e-mail (see Appendix 1) was sent to all employees (N=940) at the site to let them know of the web address of the questionnaire and to request their participation. Participation was voluntary and all participants were guaranteed confidentiality and anonymity. Three hundred and twelve employees (n=204 males; n=108 females) took part in this study. This represents a 33.19% response rate to the initial email invitation. The mean age of the participants was 34.11 years (SD=8.07). With a mean age of 37.8 years for the whole workforce population, the participants in the present study were slightly younger. In addition, the gender distribution in this study (app. 65% males and 34% females) was relatively similar to the whole workforce (app. 76% males and 24% females), with a slight over-representation of females taking part. In addition, the male to female distribution in the sample was similar to the national distribution of male and female employees working in the area of computers (Office for National Statistics, 1999). The job role profiles between those who participated in the study and the remaining workforce were also similar (managers/supervisors (13.14%), engineers

(28.21%), specialists and analysts (17.63%), production/technical staff (6.09%), clerical workers (10.58%), and others (23.72%)).

Instruments

Life satisfaction

The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) was used to measure global life satisfaction. This questionnaire consists of five items (e.g. "In most ways my life is close to my ideal"), presented in seven-point Likert scales, ranging from 1 ("strongly disagree") to 7 ("strongly agree"). According to Pavot and Diener (1993), an overall score of 20 represents the neutral point on the scale, or the situation in which the respondent is about equally satisfied and dissatisfied with life. Scores between 21 and 25 is an indicator of being slightly satisfied with life, and scores of 26 to 30 indicate satisfaction with life. At the opposite end of the continuum, scores between 5 and 9 represents extreme dissatisfaction with life, and scores ranging from 15 to 19 are indicative of people being slightly dissatisfied with life.

Adequate levels of reliability and validity of the SWLS have been reported. For example, Diener et al. (1985) found that the scale had a high level of internal reliability (α=.87), and a test-retest correlation coefficient of r = .82, indicating good external reliability. With regard to the validity of the scale, the SWLS has been compared with a number of other instruments that measure subjective well-being. For example, correlation co-efficients of .62 to .68 existed between the SWLS and the widely used Delighted-Terrible Scale by Andrews and Withey (1976). Pavot, Diener, Colvin, and Sandvik (1991) found a correlation of r = .54 between the SWLS and informant reports of life satisfaction. A study by Frisch (1991) compared the SWLS with interviewer ratings of life satisfaction and found correlations ranging between r = .51 and r = .66.

Self-esteem and perceptions of job competence

The global self-worth (six items) and perceptions of job competence (four items) subscales from the Adult Self-Perception Profile (ASPP) (Messer & Harter, 1986) were also used. The items are presented in a structured alternative format with "sort of true for me" and "really true for me" options. This format was designed to minimise the tendency of socially desirable responding (Messer & Harter, 1986). The items are scored from 1 to 4, with 4 representing the most adequate self-judgement and 1

representing the least adequate self-judgement. Half of the items in each sub-scale are reversed. In addition, participants are asked to indicate the extent to which it is important for them to be good at their work.

Messer and Harter (1986) have found adequate levels of reliability and validity for the two sub-scales. Based on two normative samples, Messer and Harter (1986) reported internal consistency reliability coefficients ranging from $\alpha = .87$ to $\alpha = .92$ for global self-worth, and $\alpha = .65$ to $\alpha = .75$ for perceptions of job competence. Validity results have also been reported for this questionnaire. In a factor analysis involving 205 individuals, a ten-factor solution was found (Messer & Harter, 1986). However, the job competence sub-scale could not be defined. According to Messer and Harter (1986), this could be due to the composition of the sample, as approximately fifty percent were full-time homemakers. The authors predicted that with a sample consisting of only full-time workers, the Job Competence sub-scale would emerge as a separate factor. This research, however, seem to be lacking.

Job satisfaction

To measure global levels of job satisfaction, a shortened version of Brayfield and Rothe's (1951) Job Satisfaction questionnaire was employed. The shortened version has previously been used by Judge et al. (1998), and consists of five items with the response scale ranging from 0 ("strongly disagree") to 10 ("strongly agree"). An example item is "I feel fairly well satisfied with my present job". A high reliability co-efficient was found for this version of the scale ($\alpha = .88$; Judge et al., 1998). With respect to the validity of this scale, the correlation between this scale and a composite measure from the Job Descriptive Index (Smith, Kendall, & Hulin, 1969) was $r = .89$ (Judge et al., 1998). In addition, Judge et al. (1998) found an average correlation of $r = .68$ (corrected for unreliability) between self-report and significant-other reports using the scale.

Job affect

The Job Affect Scale (JAS; Brief et al., 1988) was used to assess job affect within the past week. The scale consists of 20 items and is based on Watson and Tellegen's (1985) consensual mood structure. A confirmatory factor analysis of the scale by Burke et al. (1989) showed that the twenty mood descriptors should be conceptualised as four unipolar factors (nervousness, relaxation, enthusiasm, and fatigue). Participants are asked to indicate whether they have felt each of the mood descriptors at work during the

past week, using a Likert form scale ranging from 1 ("very slightly or not at all") to 5 ("very much"). Ten of the items are indicators of negative affect and the other ten items are indicators of positive affect at work. Brief et al. (1988) did not examine the internal reliability of the scale, so the present study calculated Cronbach's alpha co-efficients.

Physical self-worth

The Physical Self-Worth (PSW) subscale from The Physical Self-Perception Profile (PSPP; Fox, 1990) was also used. Here, physical self-worth refers to general feelings of happiness, satisfaction, pride, respect and confidence in the physical self (Fox, 1990), and represents a superordinate global construct of the physical self. The subscale consists of six items, with the response format organised as four-point structured alternatives. This is a widely acclaimed scale which has received strong support for its reliability and validity across a wide range of populations (Byrne, 1996). For example, internal consistency results, based on student populations, have found alpha reliability co-efficients of the physical self-worth scale ranging between $\alpha = .80$ and $\alpha = .87$ (Fox, 1990). In addition, Sonstroem et al. (1994) established a Cronbach alpha co-efficient of $\alpha = 87$ in a sample including adult female aerobic dancers. With regard to the construct validity of the whole PSPP, based on a confirmatory factor analysis, Sonstroem et al. (1994) found that the scale had an acceptable fit (i.e. CFI = .91; RMSR = .05) according to the criteria for acceptable model fit at the time.

Physical satisfaction

The Physical Satisfaction Scale, which is a four item scale, was designed in order to assess the degree of satisfaction with health, and appearance related factors (overall appearance, weight, and shape/body build). The items were based on a review of the literature on the cognitive component of body image, and were similar to items from the Multidimensional Body Self-Relations Questionnaire (Cash, Winstead, & Janda, 1986). However, the scale was constructed to provide a short scale that represented overall indicators of physical satisfaction (rather than specific ones, such as satisfaction with hips, thighs, and arms), and which had shown relations to exercise participation. The response format consists of a five-point Likert-type scale ranging from 1 ("completely dissatisfied") to 5 ("completely satisfied"). Previous factor analysis extracted one factor that explained 60.21% of the variance (Thøgersen, Fox, & Ntoumanis, 2002).

Physical activity

Baecke's Habitual Physical Activity Questionnaire (Baecke, Burema, & Frijters, 1982) was used to measure self-reported levels of physical activity. This questionnaire measures physical activity in three different domains: work, exercise and sport, and leisure-time. It also calculates a total index of physical activity. In the present study, respondents were allowed to record up to four different sport and exercise activities (as in Sternfeld, Ainsworth, & Quesenberry, 1999). Each sport and exercise activity was coded by intensity and then multiplied by hours and months to provide an overall sport and exercise score. For example, one person may cycle 1 to 2 hours per week, 4 to 6 months of the year. The intensity code assigned to cycling is 1.26, 1-2 hours per week is assigned the code 1.5, and 4-6 months per year has the code 0.42. These are then multiplied to obtain the activity score for cycling: 1.26 * 1.5 * 0.42 = 0.79. This process is repeated for the remaining sport and exercise activities that the person takes part in. Then these scores are summed, and divided by the number of the activities done. If the resulting score, for example, is 2.88, the sport and exercise score is assigned a value of 2. To obtain an index of physical activity for each domain (work, exercise/sport, and leisure), the domain-specific responses are averaged which gives an average score that ranges from 1 to 5.

The combined physical activity levels across domains were divided into physical activity quintiles. These quintiles were used to examine differences between different physical activity levels in the three components of well-being. To test the model, a continuous variable of physical activity is needed rather than a categorical one. Therefore, the overall exercise/sport index was used on its own. The reason is that it is the only activity domain that can be calculated into a continuous variable in a meaningful way, i.e. the exercise/sport index can be re-calculated into metabolic equivalents (MET values). 1 MET is the oxygen consumption required at rest, or approximately 1kcal/kg/hr. Mode, frequency, and duration of physical activity were converted into an activity score expressed as MET hours per week. The MET values were assigned to each reported type of activity based on updated research by Ainsworth et al. (2000). Adequate psychometric properties for this questionnaire have been reported in various studies (Baecke et al., 1982; Jacobs, Ainsworth, Hartman, & Leon, 1993). For example, Baecke et al. (1982) and Jacobs et al. (1993) have found that the

test-retest reliability of each sub-scale (work, sport, and leisure) range between $r = 0.74$ and $r = 0.93$. Numerous studies have also reported the validity of the questionnaire through comparisons with other physical activity questionnaires as well as other measures of physical activity. For example, Cauley, LaPorte, Sandler, Schramm, and Kriska (1987) compared this questionnaire with items from the Paffenbarger questionnaire, and found correlation co-efficients of $r = .06$ (Baecke work index), $r = .19$ (leisure index) and $r = .48$ (sport index). Jacobs et al. (1993) compared the Baecke questionnaire with measures of maximum oxygen consumption, and established a correlation co-efficient of $r = .54$. Lastly, Folsom et al. (1997) have provided support for the validity of this questionnaire in a large-scale prospective study with middle-aged men and women, where they showed that the questionnaire predicted CHD incidence.

A copy of the questionnaire pack can be found in Appendix 2.

RESULTS

Reliability and factor analyses

All scales were tested for their internal reliability, and the results are shown in Table 3.1 and Table 3.2. As may be seen, all scales had Cronbach's alpha co-efficients of $\alpha = .70$ or above for both gender groups. These results point to satisfactory internal reliabilities for the scales (Cronbach, 1951).

In addition, all the well-being scales were factor analysed. Due to the fairly large sample size, analyses were carried out separately for males and females in order to ensure that the factor structures were similar. Principal axis factoring was used as the extraction method for all scales. Whereas Principal components analysis determines the factors that maximise the explained variance in the observed variables, principal axis factoring is one extraction method which aims to establish the factors that maximise the explanation of the correlations among the observed variables (Biddle et al., 2001). Kline (1994) and Tabachnick and Fidell (1996) have proposed some criteria for extraction. These include a) eigenvalues greater than 1.0, to indicate that a component explains more variance than any single item; b) a minimum of approximately 5% explained variance per component; and c) unique loadings of .40 and above, and of at least .10 difference in the loadings when items cross-loaded. To determine the number of factors in the scales, free solutions were used, as the numbers of factors to be extracted was not

specified. Table 3.1 presents the results of the factor analyses for those scales which consist of a single factor. Because the JAS was alleged to consist of multiple factors (Burke et al., 1989), the results of this factor analysis are presented following this section.

Table 3.1. Summary of reliability and factor analyses results for all scales, except job affect

	α		Eigen-value		Explained variance (%)		Factor loadings	
	Males	***Females***	***Males***	***Females***	***Males***	***Females***	***Males***	***Females***
PHYSICAL ACTIVITY	.70	.70						
LIFE SATISFACTION	.88	.89	3.39	3.52	67.83	70.33		
Life close to ideal							.88	.90
Conditions of life excellent							.83	.82
Overall satisfied with life							.89	.88
Gotten important things in life							.77	.77
If living life over, changing almost nothing							.74	.82
SELF-ESTEEM	.86	.87	3.61	3.71	60.21	61.79		
Liking the way of leading life							.66	.81
Being happy the way one is							.76	.76
Being a worthwhile person							.72	.73

Being pleased with oneself							.86	.86
Being satisfied with oneself							.86	.84
Liking the kind of person one is							.77	.72
PERCEPTIONS OF JOB COMPETENCE	.78	.77	2.48	2.39	62.06	59.73		
Satisfied the way of doing work							.77	.80
Feeling very good at work							.85	.79
Being productive at work							.81	.78
Being proud of work							.71	.71
JOB SATISFACTION	.83	.88	3.06	3.43	61.14	68.66		
Satisfaction with present job							.85	.92
Most days enthusiastic about job							.86	.91
Each day of work seeming like it will never end							.56	.64
Finding real enjoyment in work							.88	.86
Finding job rather unpleasant							.72	.78

PHYSICAL SELF-WORTH	.88	.90	3.81	4.05	63.50	67.56		
Proud of what one can do physically							.69	.67
Happiness with kind of physical person							.77	.77
Confidence with physical self							.78	.84
Positive feeling about physical self							.83	.87
Respect for physical self							.79	.82
Satisfaction with kind of physical person							.91	.94
PHYSICAL SATISFACTION	.80	.81	2.53	2.55	63.23	63.74		
Satisfaction with appearance							.70	.64
Satisfaction with health							.58	.65
Satisfaction with weight							.77	.74
Satisfaction with shape/ body build							.81	.85

As may be seen in Table 3.1, the free solution produced a single factor from the SWLS, and consequently the solution was not rotated (this also applies to the remaining scales in Table 3.1). The one factor explained a high degree of variance in the items; 67.83% (males), and 70.33% (females). According to Kline (1994), factor loadings above .60 can be characterised as high, and factor loadings above .30 are considered as acceptable. All factor loadings in the scale were consistently high according to the criteria set by Kline (1994), and the SWLS therefore had an acceptable factor structure.

The factor extracted from the global self-worth scale accounted for more than 60% of the variance in the items. In addition, the factor loadings could all be considered high, as they were above .60.

For females, the single extracted factor in the job competence subscale explained just under 60% of the variance, however, for males it surpassed 60%. All factor loadings were high for both gender as they were well above the .60 threshold set by Kline (1994).

With regard to job satisfaction, the factor accounted for 61.14% and 68.66% of the variance for males and females, respectively. With the exception of the item "each day of work seeming like it will never end" for males in which the factor loading was above the acceptable threshold (Kline, 1994), all factor loadings were high for the scale.

The factor extracted from the physical self-worth subscale explained 63.50% of the variance for males, and 67.56% of the variance for females. In addition, all factor loadings were above .60. This subscale, therefore, had an acceptable factor structure.

The variance accounted for by the one factor extracted from the physical satisfaction scale was 63.23% and 63.74% for males and females, respectively. With one exception, all factor loadings for both gender could be considered high. The item, "satisfaction with health", with a factor loading of .58 was only for males and could still be considered acceptable according to the criteria set by Kline (1994).

Principal axis factoring was also employed to determine the factor structure of the JAS. It was expected that the principal axis factoring would reveal a four-factor structure due to confirmatory factor analysis findings by Burke et al. (1989). However, as the free solution initially produced five factors, the solution was rotated using the direct oblimin method. The reasons for using this method was a) because the factors in the JAS were assumed to be interdependent (Burke et al., 1989), and therefore oblique solutions should be used, and b) compared to the varimax rotation method, which

assumes no significant correlations among the factors, oblique solutions, such as the direct oblimin method, is more appropriate when the aim of the factor analysis is to "obtain several theoretically meaningful factors or constructs" (Hair et al., 1998, p. 110).

Although five factors were derived from the analysis, one factor was labelled 'undefined' as it was meaningless from a theoretical point of view. Hair et al. (1998) have suggested that in the case where a solution produces an undefined factor, it may be disregarded, and only those factors that are meaningful should be interpreted. To further support the claim that only four factors should be interpreted, scree tests may be carried out. According to Hair et al. (1998), the aim of the scree test is to identify the optimal number of factors that can be extracted before the amount of unique variance begins to dominate the common variance structure. The latent roots are plotted against the number of factors in their order of extraction, and the shape of the resulting curve is used to assess the cut-off point (Hair et al., 1998). The point at which the curve first begins to flatten indicates the maximum number of factors to extract (Hair et al., 1998). Scree tests were therefore carried out for males and females for the JAS and the results are presented in Figures 3.1 and 3.2.

Figure 3.1. Scree test of factor analysis for males on the JAS

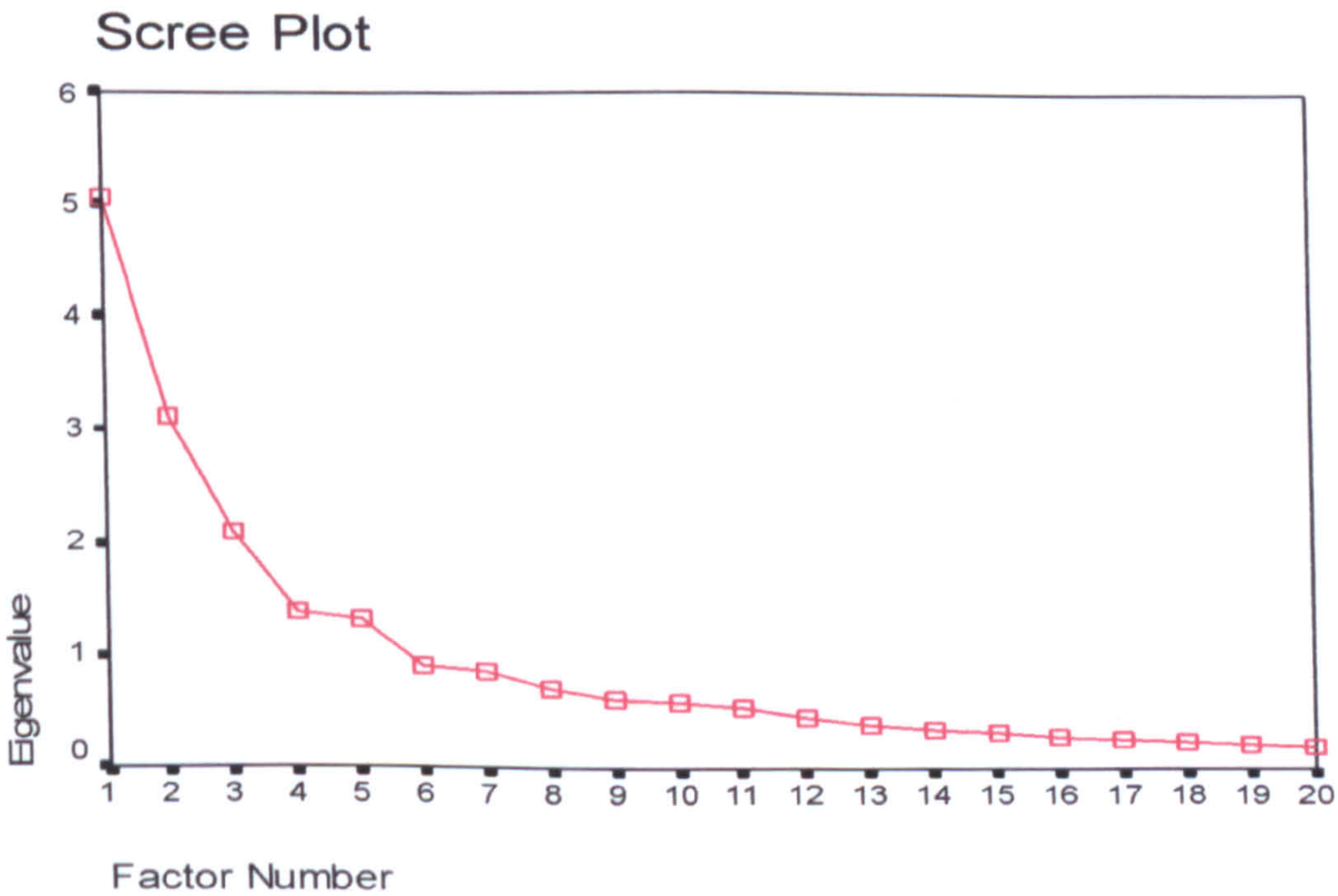
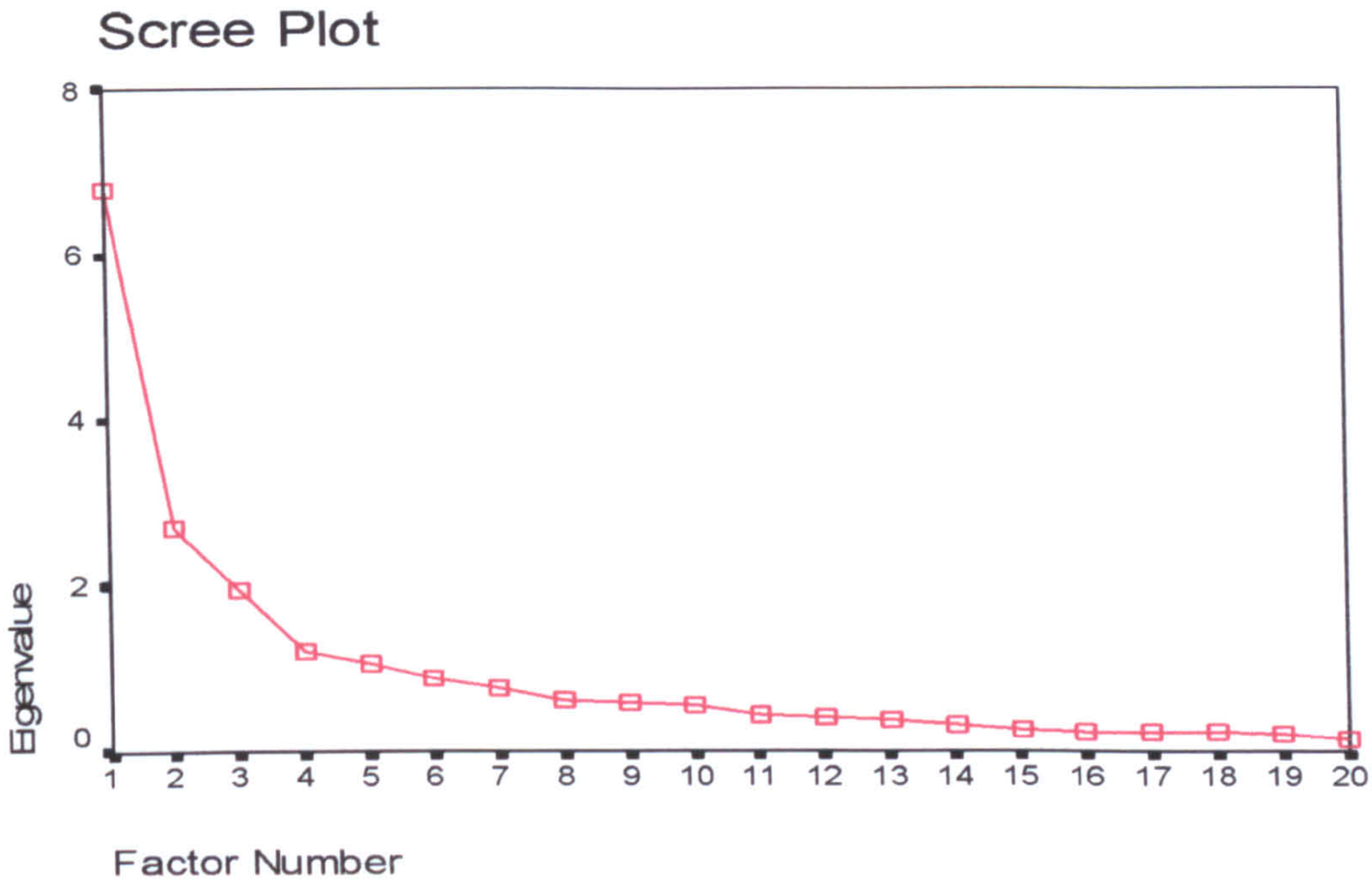


Figure 3.2. Scree test of factor analysis for females on the JAS



Both Figure 3.1 and 3.2 show that four factors are most appropriate. The results of the analysis are presented in Table 3.2.

Table 3.2: Reliability and factor analyses results for JAS by gender

	Items	Factor 1: Relaxation	Factor 2: Enthusiasm	Factor 3: Fatigue	Factor 4: Nervousness	H^2
MALES	Calm	-.59				.55
	Relaxed	-.72				.68
	At rest	-.63				.39
	Placid	-.55				.34
	Strong		.44			.41
	Excited		.83			.61
	Enthusiastic		.79			.56
	Peppy		.35			.27
	Elated		.82			.55
	Sleepy			.83		.62
	Dull			.41		.39
	Drowsy			.90		.66
	Sluggish			.66		.60
	Fearful				.78	.58
	Nervous				.76	.54
	Jittery				.80	.55
	Eigenvalues	2.63	2.93	2.98	2.28	

	Percentage of variance	25.27	15.50	10.49	7	
	α	.76	.79	.81	.83	
	Items	**Factor 1: Enthusiasm**	**Factor 2: Nervousness**	**Factor 3: Relaxation**	**Factor 4: Fatigue**	**H^2**
FEMALES	Active	-.58				.46
	Strong	-.64				.60
	Excited	-.62				.55
	Enthusiastic	-.78				.63
	Elated	-.50				.51
	Distressed		.50			.54
	Scornful		.42			.50
	Hostile		.43			.61
	Fearful		.69			.52
	Nervous		.82			.57
	Jittery		.74			.56
	Calm			.75		.63
	Relaxed			.74		.72
	Peppy	-.31		.57		.61
	At rest			.67		.56

	Sleepy			.94	.56
	Dull			.40	.69
	Drowsy			.66	.64
	Sluggish			.41	.65
	Eigenvalues	4.02	4.01	4.14	3.25	
	Percentage of variance	33.91	13.55	9.74	5.97	
	α	.83	.85	.83	.84	

It is interesting to note the differences in explained variance of the factors between the male group and the female group. Table 3.2 shows that the factors relaxation and fatigue explained somewhat more variance in the items for males (25.27% for relaxation and 10.49% for fatigue) than for females (9.74% for relaxation and 5.97% for fatigue). In contrast, the factor enthusiasm and nervousness explained more variance in the items for females (33.91% for enthusiasm and 13.55% for nervousness) than for males (15.50% for enthusiasm and 7% for nervousness).

Table 3.2 also shows that, for males, the factor labeled relaxation was similar to the relaxation factor produced by Burke et al. (1989). However, some cross-loading existed on the relaxation component for the females. Specifically, the item "peppy" surprisingly loaded relatively highly (.57) on the relaxation component and less so on the factor it was expected to load on (i.e. enthusiasm at -.31). In addition, the factor loading for the item "placid" was lower than .30 for females, and therefore not included in Table 3.2. Although some of the factor loadings for the factor labeled enthusiasm were only in the acceptable range (Kline, 1994), generally the results supported those of Burke et al. (1989). However, although one item that was assumed to load on this factor, the item "active" did not approach an acceptable factor loading for males (i.e. <.30). For females however, the item approached the .60 criteria for high factor loadings (Kline, 1994). As expected, the factor fatigue consisted of the same items as those by Burke et al. (1989) for both males and females. The factor loadings were all in the acceptable to high range. Finally, although the items "distressed", "scornful" and "hostile" did not approach acceptable factor loadings on the factor labeled nervousness for males, the factor loadings of these items were in the acceptable range for the females. It may be concluded that the present findings generally lend support to the four-factor structure of the JAS identified by Burke et al. (1989).

All the factors in the JAS had Cronbach's alpha co-efficients above $\alpha = .70$ for both males and females, which provides some evidence to the adequate internal reliability of the factors.

Descriptive Statistics

The distributions for age and gender of the participants in the study are presented in Table 3.3.

Table 3.3: Crosstabulations of gender and age

Age Group	Gender		Total (*N*)	Percentage of total sample
	Males	**Females**		
25 or less	27	20	47	15.06
26-30	34	30	64	20.51
31-35	48	28	76	24.36
36-40	44	14	58	18.59
41-45	28	10	38	12.18
46-50	14	5	19	6.09
51-55	7	1	8	2.56
Over 55	2	-	2	0.64

Table 3.3 shows that the largest proportion of males are between 31 and 40 years old, whereas the largest group of females is between 26 and 35 years old. In addition, the occupations of both males and females were analysed, and the distribution is shown in Table 3.4.

Table 3.4: Crosstabulations of gender, working hours, and job title

Job Title	*N* by gender			% by gender	
	Male	**Female**	**Total (*N*)**	**Male**	**Female**
Hours work/week	42.37	40.34			
Managers/supervisors	29	12	41	14.29	11.21
Engineer	69	19	88	33.99	17.76
Specialists/analysts	35	20	55	17.6	18.52
Production/technical staff	17	2	19	8.33	1.85
Office/clerical	7	26	33	3.45	24.30
Others	46	28	74	22.55	25.93

Males worked significantly longer hours per week compared to females in this sample (t (305) = 2.88; $p < .01$). It is most likely that this finding reflects the fact that males and females tend to have different kinds of jobs. Indeed, the sample consists of a substantially higher percentage of male engineers (33.99%) compared to female engineers (17.76%). In addition, 24.30% of females and only 3.45% of male participants are clerical/office workers. Furthermore, a slightly higher percentage of males are supervisors or managers (14.29%) compared to females (11.21%). A relatively large proportion of both gender are defined as being in the "other" category. The low percentage of production and technical staff reflects the small amount of manufacturing taking place at this site (personal communication with a senior staff of the corporation).

The means and standard deviations for all constructs by gender are presented in Table 3.5 (the three indices of physical activity are presented individually here).

Table 3.5: Means (M) and standard deviations (SD) for all constructs by gender

	M (SD)	
	Males	**Females**
Life satisfaction	22.88 (6.16)	23.33 (6.70)
Self-esteem	17.78 (3.49)	17.55 (3.85)
Perceptions of job competence	11.72 (2.55)	11.94 (2.59)
Job satisfaction	35.81 (8.37)	34.69 (10.20)
Enthusiasm at work	16.73 (4.25)	15.74 (4.81)
Relaxation at work	11.36 (3.03)	10.55 (3.17)
Nervousness at work	10.84 (4.14)	10.30 (4.70)
Fatigue at work	8.75 (3.19)	9.36 (3.65)
Physical self-worth	15.69 (2.37)	14.27 (2.46)
Physical satisfaction	13.10 (3.13)	12.08 (3.52)
Physical activity: Work index	2.29 (.30)	2.27 (.27)
Physical activity: Leisure-time index	2.95 (.67)	2.74 (.73)
Physical activity: Sport/Exercise index	3.04 (.62)	3.03 (.59)

Pavot and Diener (1993) have proposed a set of criteria for evaluating life satisfaction based on the SWLS. They suggest the following classification of scores: total scores of 5 to 9 are indicative of being extremely dissatisfied with life, 15 to 19 signals a slight dissatisfaction with life, scores 21 to 25 represent slight satisfaction with life, and scores between 26 and 30 are indicative of being satisfied with life (Pavot & Diener, 1993). Based on these criteria, Table 3.5 show that both males and females in the present study may on average be characterised as being slightly satisfied with life ($M = 22.88$ and $M = 23.33$, respectively). The life satisfaction of males and females in the present study is slightly lower than the life satisfaction of adults from other studies (e.g. George, 1991; Pavot et al., 1991).

Global self-esteem scores and scores on perceptions of job competence are reasonably high, almost averaging ¾ of the maximum score (=24) on the scale. However the mean scores are lower than those reported by Messer and Harter (1986) based on full-time working women and men, who reported average scores for both constructs which superseded ¾ of the maximum score.

The mean job satisfaction score may only be compared to that reported by Judge et al. (1998), as this is the only other study that has adopted the same construct. The findings from the present study show that levels of job satisfaction are lower than for a sample of physicians, but equivalent to those of graduate students (Judge et al., 1998).

Finally, physical self-worth scores may be compared to findings from other studies. Compared to samples of US college students, the means of physical self-worth for both males and females in the present study are somewhat lower (Fox, 1990).

To compare whether any significant differences existed between the gender groups on the well-being constructs, a multivariate analysis of variance was carried out with gender as the grouping variable and the well-being constructs as the dependent variables. The MANOVA was significant (Pillai's criterion = .14; F (10, 277) = 4.49; p < .01). The univariate effects revealed that males and females differed significantly on relaxation at work (F (1) = 4.52; p < .05), enthusiasm at work (F (1) = 3.93; p < .01), physical self-worth (F (1) = 28.60; p < .01), and physical satisfaction (F (1) = 10.39; p < .01). Specifically, the men had the most favourable well-being scores on all four constructs.

To examine the differences between males and females on patterns of physical activity, another multivariate analysis of variance was carried out. The MANOVA was conducted with gender as the grouping variable and physical activity indices as the dependent variables. However, males and females did not differ significantly on physical activity levels in the three domains, because the MANOVA was not significant (Pillai's criterion = .021; F (3, 297) = 2.141; p > .05).

Relationships between physical activity quintiles and mental well-being components

To examine the relationships between physical activity quintiles and the mental well-being constructs, bivariate correlations were carried out. The technique used was Pearson's product moment correlation co-efficients, because as stated by Vincent

(1995), Pearson's correlation may be based on different measurement scales (i.e. the non-parametric nature of the physical quintile scoring, and the parametric character of the scoring of the well-being constructs). The associations between physical activity quintiles and all constructs of mental well-being are presented in Table 3.6.

Table 3.6: Bivariate correlations among physical activity quintiles and all mental well-being constructs

	2	3	4	5	6	7	8	9	10	11
1. LS	.56**	.29**	.34**	.32**	.24**	-.30**	-.28**	.35**	.41**	.18**
2. SE		.48**	.31**	.30**	.29**	-.35**	-.31**	.41**	.43**	.17**
3. JC			.31**	.21**	.17**	-.28**	-.25**	.04	-.03	.02
4. JS				.55**	.31**	-.34**	-.47**	.06	.03	.17**
5. Ent					.33**	-.10	-.39**	.23**	.24**	.33**
6. Rel						-.48**	-.22**	.07	.11*	.12
7. Ner							.41**	.05	-.05	-.03
8. Fat								-.13*	-.13*	-.14*
9. PSW									.63**	.32**
10. PS										.29**
11. PA (quintiles)										

LS=Life Satisfaction, SE=Self-Esteem, JC=Job Competence, JS=Job Satisfaction, Ent=Enthusiasm at work, Rel=Relaxation at work, Ner=Nervousness at work, Fat=Fatigue at work, PSW=Physical Self-Worth, PS=Physical Satisfaction, PA=Physical Activity

As expected (see Introduction), physical activity showed a small but significant correlation with the global well-being constructs (life satisfaction and self-esteem). In contrast, physical activity was moderately and significantly associated with enthusiasm at work (r=.33), physical self-worth (r=.32), and physical satisfaction (r=.29). In other words, physical activity is more closely related to specific rather then global elements of well-being, which support the existence of a hierarchical model of exercise and well-being. It is also interesting to note the moderate correlations between enthusiasm at work and physical self-worth (r=.23), and enthusiasm at work and physical satisfaction (r=.24).

The relationship between physical self-worth and affect at work

Harter (1990) has argued that self-concept domains relate to emotional outcomes only through the mediating effect of global self-worth. However, Sonstroem and Potts (1996) challenged her supposition, and tested whether physical self-concepts were associated with indices of adjustment independent of global self-esteem, based on previous research which had shown that perceived physical competence predicted self-enhancement properties, which are usually ascribed to global self-esteem (Sonstroem, Harlow, & Salisbury, 1993; Sonstroem & Kampper, 1980). Sonstroem and Potts (1996) found that perceived physical competence was significantly related to affective well-being, independent of global self-esteem and socially desirable responding. To test their findings in the work setting, a partial correlation analysis was carried out between physical self-worth and the four uni-polar affect dimensions, controlling for global self-esteem. The results showed that physical self-worth was significantly related to enthusiasm at work (r=.23), and fatigue at work (r=-.13), but not with relaxation (r=.07) or nervousness at work (r=.05). The results of these partial correlation analyses replicate the bivariate correlations above. In other words, the findings support those of Sonstroem and Potts (1996), and suggest that global self-esteem does not fully mediate the relationship between physical self-worth and affective states at work.

Differences between Physical Activity Quintiles on Well-Being Components

MANOVA's were conducted to examine the hypothesis that stated that significant differences would exist between physical activity quintiles on measures of the physical self. The first MANOVA examined the differences between physical activity groups

(quintiles) on physical well-being, and it was significant (Pillai's criterion = .133; $F(8, 590) = 5.25$; $p<0.01$). Table 3.7 presents the results of the univariate differences among physical activity groups in physical self-worth and physical satisfaction.

Table 3.7. Mean differences of physical activity quintiles in physical well-being measures (df = 4, 295)

Physical Activity Quintiles	**Physical Self-Worth**		**Physical Satisfaction**	
	M	***SD***	***M***	***SD***
0-20th	2.35_a	.05	2.93_a	.09
20-40th	2.45_{ab}	.05	2.93_a	.10
40-60th	2.55_{bd}	.05	3.14_{ab}	.10
60-80th	2.63_{bd}	.05	3.35_b	.09
80-100th	2.75_{cd}	.05	3.49_b	.10
	F	***P***	***F***	***p***
	9.48	.00	7.28	.00

Note: Quintiles with the same subscripts ($_{a,b.c,d}$) in the same column do not differ significantly at $p<.05$

Table 3.7 shows that all differences were in the expected direction. Specifically, a post hoc Tukey test revealed that significant differences in physical self-worth existed between the 0-20th quintile and the 80-100th quintile (p=.00), between the 0-20th group and the 60-80th group (p=.00), between the 0-20th quintile and the 40-60th quintile (p=.04), and finally between the 20-40th quintile and the 80-100th quintile (p=.00). A similar pattern was found for physical satisfaction. The significant differences were located between the 0-20th and the 80-100th physical activity quintile group (p=.00), between the 0-20th and the 60-80th quintile (p=.01), between the 20-40th quintile and the 80-100th quintile (p=.00), and between the 20-40th and the 60-80th quintile (p=.01). The results of this MANOVA suggest that dose-response relationships exist between physical activity and physical well-being.

The second MANOVA, which examined the differences between physical activity groups on work-related well-being, was also significant (Pillai's criterion = .203; $F(24, 1160) = 2.58$; $p<0.01$). This was the case for job satisfaction, relaxation at work, and enthusiasm at work, which all increased with increasing levels of physical activity. The univariate analysis is presented in Table 3.8.

Table 3.8. Mean differences of physical activity quintiles in work-related well-being measures (df = 4, 292)

Physical Activity Quintiles	JS		JC		Ner		Fat		Rel		Ent	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
0-20th	6.60_a	.22	2.91_a	.08	1.84_a	.09	2.43_a	.10	2.67_{ab}	.09	2.51_a	.09
20-40th	6.92_{ab}	.25	2.87_a	.09	1.92_a	.10	2.25_a	.11	2.67_{ab}	.10	2.58_a	.10
40-60th	7.03_{ab}	.24	3.03_a	.09	1.64_a	.10	2.23_a	.11	2.93_{ab}	.10	2.61_a	.09
60-80th	7.35_{ab}	.23	2.95_a	.08	1.81_a	.09	2.21_a	.11	2.62_a	.10	3.00_b	.09
80-100th	7.49_b	.24	2.93_a	.09	1.82_a	.10	2.04_a	.11	3.02_b	.10	3.18_b	.09
	F	*p*	*F*	*p*	*F*	*p*	*F*	*P*	*F*	*p*	*F*	*p*
	2.37	.05	.48	.75	1.15	.33	1.73	.14	3.34	.01	10.34	.00

JS=Job Satisfaction, JC=Job Competence, Ner=Nervousness at work during past week, Fat=Fatigue at work during past week, Rel=Relaxation at work during past week, Ent=Enthusiasm at work during past week

Note: Quintiles with the same subscripts in the same column do not differ significantly at $p<.05$

Univariate analyses revealed that the significant difference between groups on job satisfaction was located between the 0-20th quintile and the 80-100th quintile (p=.05). On relaxation at work, the significant group difference was located between the 60-80th and the 80-100th quintile (p=.03). Finally, it was revealed that the significant differences in enthusiasm at work were located between the 0-20th and the 80-100th quintile (p=.00), between the 0-20th and the 60-80th quintile (p=.00), between the 20-40th and the 60-80th quintile (p=.01), between the 20-40th and the 80-100th quintile (p=.00), between the 40-60th and the 60-80th quintile (p=.03), and between the 40-60th and the 80-100th quintile (p=.00). Hence, there is some support for a dose-response relationship between physical activity three elements of work-related well-being.

Finally, a MANOVA was carried out to examine the differences between the activity groups on global well-being. This MANOVA was also significant (Pillai's criterion = .072; F (8, 590) = 2.749; p<.05). The univariate differences are presented in Table 3.9.

Table 3.9. Mean differences of physical activity quintiles in global well-being measures (df = 4, 295)

Physical Activity Quintiles	Self-Esteem		Life Satisfaction	
	M	***SD***	***M***	***SD***
0-20th	2.78_a	.07	4.44_a	.15
20-40th	2.91_a	.08	4.31_a	.17
40-60th	2.98_a	.08	4.36_a	.16
60-80th	3.01_a	.08	4.81_{ab}	.16
80-100th	3.07_a	.08	5.04_b	.16
	F	***p***	***F***	***p***
	2.21	.07	3.84	.01

Note: Quintiles with the same subscripts in the same column do not differ significantly at p<.05

Table 3.9 reveals that the significant differences in life satisfaction between the groups were located between the 0-20th and the 80-100th quintile (p=.05), between the

20-40th and the 80-100th (p=.02), and between the 40-60th and the 80-100th quintile (p=.03). Self-esteem was higher in more physically active groups, but the results failed to reach significance. Hence, there is partly support for the existence of dose-response relationships between physical activity and global well-being.

In summary, the results of the multivariate analyses suggest that dose-response relationships exist between physical activity and the three components of well-being. In other words, there is considerable support for the first hypothesis that stated that more physically active employees generally have higher levels of physical, work-related and global mental well-being.

Relationships between exercise participation and components of mental well-being

Structural equation modelling (SEM) was used to examine the fit of the data to a specified model. The parameters of a SEM model can be specified simultaneously, which is an important advantage compared to regression analytic techniques. The EQS software (version 5.6) was employed, and the data were analysed using the maximum likelihood estimation method. Almost all constructs in the model were represented by a latent unobserved factor, which was represented through its indicator items. Only exercise and sport participation was not measured with a latent factor because it was a single-item variable. To retain parsimony in the a priori model of well-being, only one measure of positive well-being and measures that were hypothesised to show either direct or indirect relationships to exercise and the physical self were included. Therefore, the measures of job competence, nervousness, and fatigue were not included in the model. A decision was also taken not to include relaxation at work in the model in order to examine the role of just one dimension of positive affect at work (i.e. enthusiasm at work).

Prior to model specification, all scales were subjected to confirmatory factor analysis (CFA). Most factors had very good model fit, but one item had to be removed from the self-esteem, job satisfaction, and enthusiasm scales. The results of the CFA's are provided in Table 3.10.

Table 3.10. Fit indices for Confirmatory Factor Analysis Models

	x^2	df	NNFI	CFI	IFI	SRMR	RMSEA (90% CI)
Life Satisfaction+ (5 items)	9.32	5	.99	1.00	1.00	.02	.05 (.00 - .11)
Self-Esteem (6 items)	49.69**	9	.92	.95	.95	.05	.12 (.09 - .16)
Self-Esteem+ (5 items)	17.19**	5	.96	.98	.98	.03	.09 (.05 - .14)
Job Satisfaction (5 items)	22.19**	5	.96	.98	.98	.05	.11 (.06 - .15)
Job Satisfaction+ (4 items)	.14	2	1.00	1.00	1.00	.00	.00 (.00 - .03)
Enthusiasm at work (6 items)	36.62**	9	.91	.94	.94	.05	.10 (.07 - .14)
Enthusiasm at work+ (5 items)	11.80*	5	.96	.98	.98	.03	.07 (.02 - .12)
Physical Self-Worth+ (6 items)	32.13**	9	.97	.98	.98	.03	.09 (.06 - .13)
Physical Satisfaction+ (4 items)	5.40	2	.98	.99	.99	.02	.07 (.00 - .15)

+ = Solutions used in SEM

* = $p < .05$

** = $p < .01$

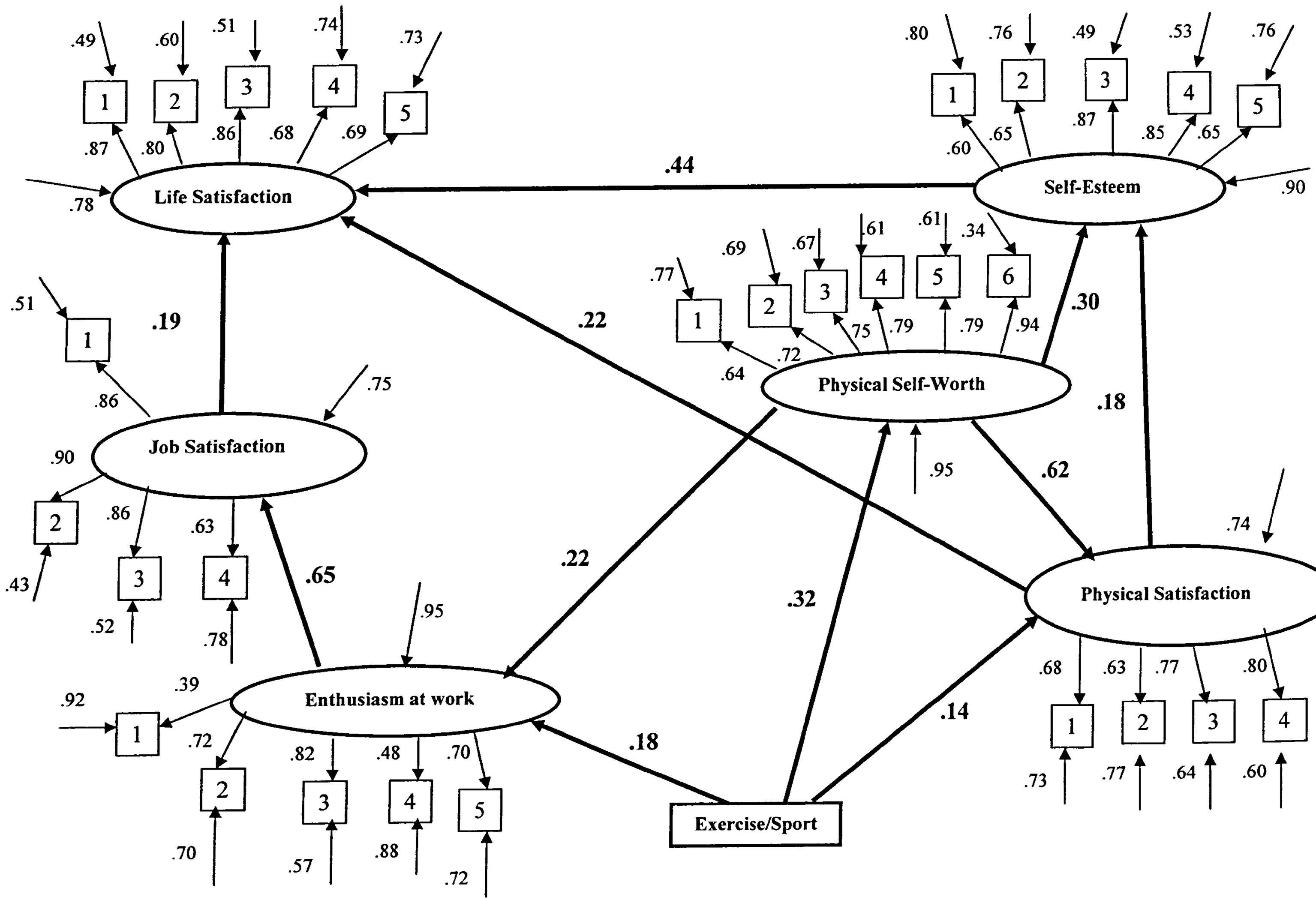
In order to evaluate the adequacy of the model's fit to the data, several indices of fit were examined: the chi square (x^2) value, the Comparative Fit Index (CFI), the Non-Normed Fit Index (NNFI), the Incremental Fit Index (IFI), the Standardised Square Root Mean Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA) with its 90% confidence interval (CI). A good factor structure is implied when the difference between the actual and predicted covariance matrices, evaluated with the chi-square (x^2) statistic, is non-significant. However, the chi-square statistic is very sensitive to relatively large sample sizes and tends to reject well-specified models. Therefore, additional goodness of fit indices were used to evaluate the appropriateness of the CFA solution (for a description of these indices see Hair et al., 1998). Some of these fit indices are the Bentler-Bonett Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), the Root Mean Square Error of Approximation (RMSEA) and its 90% confidence interval (CI). A simulation study by Hu and Bentler (1999) showed that a good model fit (i.e., a good factor structure) is achieved when the NNFI and the CFI values are close to .95, the SRMR is close to .08, and the RMSEA is close to .06. Furthermore, a close fit of the model to the intended population is implied when the lower bound of the 90% CI of the RMSEA includes the value of .05.

Based on the rationale provided in the introduction to the present study, which was based on theory and empirical findings, the specified paths of the model were:

- Exercise and sport participation is directly related to physical well-being (physical self-worth and physical satisfaction), and enthusiasm at work
- Exercise is indirectly linked to enthusiasm at work through physical self-worth, to job satisfaction through enthusiasm at work, to life satisfaction through physical satisfaction, and to self-esteem through physical self-worth and physical satisfaction
- Job satisfaction is directly linked to life satisfaction
- Self-esteem is directly related to life satisfaction

The results showed that the hypothesised model fit the data very well (see Figure 3.3): x^2 (394) = 581.04 (p<.001); NNFI = .95; CFI = .96; IFI = .96; SRMR = .07; RMSEA = .04 (.03 - .05).

Figure 3.3. Structural Equation Modelling of the relationships between exercise and components of mental well-being



All hypothesised parameters in the model were significant. Specifically, the model found support for direct relationships between exercise and physical self-worth (*b*=.32), and exercise and physical satisfaction (*b*=.14). In addition, exercise was directly related to enthusiasm at work (*b*=.18). Physical self-worth was directly associated with enthusiasm at work (*b*=.22). Furthermore, physical satisfaction was related to physical self-worth (*b*=.62) and self-esteem (*b*=.18). The model also found support for all the hypothesised indirect relationships. Specifically, exercise showed indirect and significant relationships with a) self-esteem through physical self-worth (*b*=.16), b) life satisfaction through physical satisfaction (*b*=.18), and c) job satisfaction through enthusiasm at work (*b*=.18). Furthermore, a significant indirect relationship was found between physical self-worth and job satisfaction through enthusiasm at work (*b*=.18).

In view of the above results, it may be concluded that the model supported the hypothesised relationships. The significant paths of this model not only offers new information regarding the interrelationships between exercise and different components of mental well-being, but also offer suggestions for some of the potential mechanisms that may link exercise with global components of well-being for a corporate population.

DISCUSSION

The main aim of the present study was to examine the interrelationships between exercise participation and three components of mental well-being in a sample of corporate employees. Two types of analyses were used. The first analysis compared groups with different levels of physical activity participation on several well-being indicators. The second analysis used SEM to simultaneously assess the relationship among exercise and global as well as work-related well-being constructs, and to test the possible role of the physical self and work-related positive affect as mechanisms linking exercise with work-related and global well-being. Therefore, contrary to previous research the present study used a comprehensive and theoretically based approach to examine exercise and well-being in the workplace. It is hoped that findings from the present study may facilitate our understanding of the role of exercise participation in the emotional and cognitive functioning of corporate employees.

The MANOVA analyses revealed a consistent pattern of results, with some evidence of dose-response relationships between physical activity and mental well-being constructs. Increasing levels of physical activity were consistently associated with

more favourable levels of well-being on most constructs examined. Although the present study was cross-sectional, one of the criteria purported to be an indicator of causality is dose-response relationships (Hill, 1965). Future research should aim to replicate these findings using longitudinal research designs.

The model revealed several strong relationships. A direct path was found between exercise and measures of the physical self. It seems that employees who are more physically active also exhibit a stronger sense of physical worth, which is a domain specific sub-component of self-esteem. In addition, an indirect relationship between exercise and global self-esteem was found through physical self-worth, which supports Sonstroem and Morgan's (1989) Exercise and Self-Esteem Model. These results also support the findings of previous studies with different populations (for a review see Fox, 2000), and suggest that physical self-worth is a likely mediator in the relationship between exercise and self-esteem.

Furthermore, the model found support for the relationship between physical satisfaction and physical self-worth and between physical satisfaction and self-esteem, further supporting the Exercise and Self-Esteem Model. However, the latter finding assumes that physical satisfaction is equated with physical acceptance. Self-acceptance has been defined as the "personal regard and liking that people hold for themselves and for their attributes irrespective of their levels of perceived competence" (Sonstroem, 1997, p. 6-7). One could infer from this definition that physical acceptance represents satisfaction with the physical self. Indeed, Baldwin and Courneya (1997) used a measure of physical satisfaction as an indicator of physical acceptance when they tested the Exercise and Self-Esteem Model.

Physical self-worth was also significantly related to enthusiasm at work. This finding extends the findings by Sonstroem and Potts (1996) into the work context, and illustrates that regardless of the mediating effect of global self-esteem, physical self-worth may have emotional adjustment properties in that it may enhance positive affect (Marsh & Sonstroem, 1995).

Exercise participation was directly linked with enthusiasm at work. Specifically, more physically active employees were more enthusiastic at work within the past week. This finding is consistent with other studies examining this relationship in a work context (e.g. Daley & Parfitt, 1996) and with reviews and meta-analyses on exercise and affect (e.g. Biddle, 2000; Gauvin & Spence, 1998). The results of the present study on

exercise and dimensions of positive affect are unique in that no previous studies have examined the relationship between exercise participation and positive affect using a measure of affect which assess feelings *while at work*. The potential of exercise to enhance positive affect at work has implications for the individual's emotional well-being as well as for the health of the organisation in which he or she works. First of all, positive affect is a fundamental element of subjective well-being (Diener et al., 1999). Secondly, positive affective states are found to reduce absenteeism (Pelled & Xin, 1999) and increase worker productivity (Cote, 1999). If indeed, as seems to be the case, exercise may promote positive affective states at work, directly as well as through physical self-perceptions, the case for exercise in the work setting should be obvious.

The present study also found support for the hypothesis that exercise may have repercussions for job satisfaction. Specifically, a small but significant indirect path was found between exercise and job satisfaction through enthusiasm at work. This finding makes sense from a theoretical point of view as positive affect is one of the most important predictors of job satisfaction (Weiss et al., 1999), and seeing that exercise has the ability to enhance positive affect (Biddle, 2000). Another finding that supports a relationship between exercise and job satisfaction is that the more physically active employees were significantly more satisfied with their jobs. This confirms previous research findings (Daley & Parfitt, 1996; Kirkcaldy et al., 1994). However, as proposed by Daley and Parfitt (1996) providing employees with the opportunity to exercise may have an effect on how they generally feel about their jobs. Therefore, future longitudinal research should aim to tease out the causal mechanisms linking exercise, positive affect, and job satisfaction.

The present study also found support that more physically active employees were more satisfied with their lives in general. Again, the causality of this finding cannot be inferred from this study, however, these results are in accordance with a meta-analysis by Caspersen et al. (1994), who found a moderate and positive effect of exercise on life satisfaction. The model examined in this study also found support for a small significant indirect relationship between exercise participation and life satisfaction through physical satisfaction. The recent randomised controlled trial by Rejeski et al. (2001) has revealed a similar relationship between physical activity, satisfaction with physical function and appearance, and subjective well-being. The importance of the physical

body to most people (Davis, 1997) may partly explain the moderate correlation between physical satisfaction and life satisfaction.

It should be kept in mind that life satisfaction, like self-esteem, is a stable construct and it is therefore not likely to change over a short period of time, or change drastically as a result of change in one lifestyle behaviour. However, there is support for some positive effects of exercise on life satisfaction in this sample. The reason for this positive relationship may be found in Little's (1989) contention that well-being "will be enhanced to the extent that individuals are engaged in personal projects that are meaningful, well-structured, supported by others, not unduly stressful, and which engender a sense of efficacy" (p. 20). For many people, bodily function and appearance are important, and to the extent that exercise provides them with a means to achieve these goals, life satisfaction may be enhanced. Future research should aim to establish the optimal conditions for achieving the psychological benefits of exercise, and should therefore examine the effects of different exercise settings, exercise characteristics, and people's perceived social support for exercise.

One of the limitations of the present study was the cross-sectional design, which cannot establish causality, and therefore future research should adopt longitudinal designs. The self-report physical activity inventory may be another limitation of the study due to the possibility of socially desirable responses. However, support for subjective measures of physical activity was found in a study by Tuson et al. (1995) who discovered that *perceived* exercise intensity was a superior predictor of affective change following exercise compared to actual exercise intensity. Therefore, when it comes to understanding the mental health benefits of exercise, the subjective approach to measuring physical activity used in the present study may be superior. This should be an issue for future research.

Although previous research has established that web-based surveys show significantly lower response rates than mail-out surveys (Solomon, 2001), it is likely that the present study consisted of a biased sample due to the self-selection procedure and the relatively low response rate. However, even among this physically active sample, there were distinct differences between employees on physical activity levels and mental well-being. It is therefore more likely that a bigger range of employees

would have provided even stronger relationships between exercise and mental well-being.

In view of the findings of this study, there is support for promoting exercise as a means of enhancing the positive well-being of corporate employees, and the present research suggests that measures of physical well-being and affective states at work may shed light on the potential mechanisms linking exercise with the positive well-being of corporate employees.

General comments

The exercise and well-being model tested in the present study, using structural equation modelling, was based on an integration of well-being theories and has received empirical support. In view of these findings, it would be interesting to examine in more detail the potential existence of typologies of individuals using the constructs measured in the present study. Typologies are ways of classifying individuals according to a set number of variables that are of theoretical and/or practical importance. Most previous research has studied well-being constructs in isolation, and certainly no previous study has examined typologies of corporate employees differing in their levels of physical activity and mental well-being. An investigation of this may further our understanding of the relationship between physical activity and mental well-being variables. For example, for some people, physical activity participation may not be important to how they feel about themselves and their lives, whereas for others physical activity is imperative. Establishing typologies of employees who differ in physical activity participation and/or psychological well-being may also be an effective means of identifying individuals who have low levels of psychological well-being, and for whom it may be appropriate to design individualised interventions with the aim of improving their psychological well-being. This may have implications for the cost-effectiveness of a potential programme, and by implication for the corporation that may offer the programme. It may also reveal further interesting information about potential mechanisms.

CHAPTER FOUR

STUDY TWO: INVESTIGATING PHYSICAL ACTIVITY AND MENTAL WELL-BEING TYPOLOGIES OF CORPORATE EMPLOYEES: A CLUSTER ANALYSIS

The establishment of a preliminary model in Study 1 linking exercise with three components of mental well-being has provided some insight into the overall interrelationships between these constructs and possible routes by which exercise may affect global well-being. Indeed, support was found for the hypotheses that exercise is related to various components of mental well-being. However, to shed further light on these relationships, it will be useful to examine how employees may be differentially classified according to these constructs. For example, is it possible to have high levels of global well-being (i.e. self-esteem and life satisfaction) while being unhappy at work? In addition, do employees who do similar amounts of physical activity exhibit differential levels of mental well-being?

There is a clear lack of research studies examining the above questions. However, to answer the first question, there is some indication that life at work and life outside work spill over into each other, and it is therefore rare that the two aspects of life are segregated (Hart, 1999). However, this may not be the case for all employees. As to question number two, it is convincingly argued in numerous research accounts that exercise effects may differ according to situational phenomena, such as initial levels of well-being (e.g. Sonstroem, 1997), and exercise characteristics, such as mode or type (Berger & McInman, 1993) and motivational variables (e.g. Ntoumanis & Biddle, 1999a, 1999b). It therefore seems likely that the relationship between physical activity and the three mental well-being components differ depending on a range of variables. Although the purpose of the present study is not to examine the variables that moderate these relationships, given the differential nature of this sample's exercise routines, these previous research findings would suggest the likelihood of discovering distinct physical activity and well-being typologies of employees.

Two additional demographic variables were included in this cluster analysis: age and body mass index (BMI). Age is recognised as an important determinant of health (Frankish, Milligan, & Reid, 1998), and one large-scale population study has found that it may play a factor in the effect of physical activity on positive affect (Stephens, 1988). Specifically, the relationship between physical activity and positive affect was stronger for those above age forty. In addition, BMI is associated, not just with levels of physical functioning (Stafford, Hemingway, Stansfeld, Brunner, & Marmot, 1998), but also with constructs of mental well-being, such as life satisfaction (Greeno, Jackson, Williams, &

Fortmann, 1998). In light of the importance and relevance of these variables to the present study, it would be interesting to examine typologies of employees based on physical activity, the three components of mental well-being and these two demographic variables concurrently, as no previous study has aimed to do so.

Two individual characteristics can provide important information about potential differences between various typologies of employees. First of all, gender has been extensively examined in research dealing with both context-free and context-specific well-being. Evidence does exist that women and men consistently differ in moods and behaviours, and various potential explanations have received support, especially those focusing on personality, including affect intensity, type A personality, dispositional empathy, and coping styles (Nolen-Hoeksema & Rusting, 1999). However, interestingly, support for these differences only exists for negative moods and behaviours. In addition, recent evidence suggests that differences in job satisfaction between women and men exist in the United Kingdom (but not in the United States) with women reporting higher levels of job satisfaction than men (Clark, 1996). However, as stated by Warr (1999) this is surprising given that women are generally employed in lower quality jobs. It is possible that explanations for this finding include differences in levels of standards of comparison (Clark, 1996), or differences between desirability for extrinsic and intrinsic rewards from the job (Mottaz, 1986). Secondly, job title distribution between different typologies of employees would be interesting to examine. For example, one study has found that, for women, clerical workers have fewer coping resources and perceive stressful events as less controllable than managers. Clerical workers were also more distressed and less satisfied than managers (Long, 1998). However, a study that incorporates several job titles, rather than only two, would clearly provide additional important information.

One statistical approach, known as cluster analysis, may identify typologies of individuals according to a set of criteria of relevance to the particular study. One of the strengths of cluster analysis is that it is possible to achieve three objectives (Hair et al., 1998). One is the formulation of a taxonomy, or a classification of subjects that is empirically derived or a typology, which is a classification based on theory (Hair et al., 1998). Secondly, the cluster analysis allows for a simplification of the data whereby observations may be profiled by their general characteristics. Finally, cluster analysis, as

described above, may be used to reveal the nature of relationships (Hair et al., 1998). The present study may ultimately inform the nature of the relationships established in Study 1 according to individual criteria, as well as providing a useful strategy of targeting employees in need of enhancing well-being.

In view of the above, the main purpose of Study 2 was to identify sub-groups of corporate employees who differ according to their age, BMI, physical activity levels, and what has been described (see Chapters 2 and 3) as important well-being indicators for this population. A secondary purpose was to examine the possible differences in gender and job title distribution between the cluster groups. Although it would be possible to hypothesise about relationships between age, BMI, physical activity and mental well-being variables on an individual level in this sample of corporate employees, the simultaneous examination of typologies or profiles that vary according to these characteristics has not previously been studied. Therefore, it was decided that no hypotheses would be stated, but instead two research questions are posed with regard to the study conducted: 1) Do corporate employees have distinct profiles on physical activity participation and mental well-being, and how may they be described in terms of gender and job titles? and 2) Do these cluster profiles differ significantly in a logical way on nervousness and fatigue at work?

METHODS

Participants and procedures

The procedures and participants for the second study were the same as that reported in Study 1. Therefore, the participants were 312 (n=204 males and n=108 females) corporate employees with a mean age of 34.11 (SD=8.07), who represented job profiles which included managers/supervisors (13.14%), engineers (28.21%), specialists and analysts (17.63%), production/technical staff (6.09%), clerical workers (10.58%), and others (23.72%).

Instruments

All the instruments that were used in the present study were similar to those used in study one (i.e. SWLS, global self-worth and perceptions of job competence from ASPP,

the job satisfaction scale, JAS, physical self-worth from PSPP, and the physical satisfaction scale, and Baecke's Habitual Physical Activity Questionnaire).

Data analysis

A cluster analysis was performed to examine the physical activity, demographic and positive well-being profiles of the employees in the present study. The purpose of cluster analysis is to derive a classification scheme for grouping a number of individuals into distinct groups. In other words, the cluster analysis consists of groups that each share within-cluster homogeneity on the variables measured, while showing between-cluster heterogeneity on these variables. Therefore, individuals within clusters are similar in some way and unlike those individuals from other clusters (Aldenderfer & Blashfield, 1984).

For the purposes of the present study, a hierarchical cluster analysis was carried out to identify the numbers of clusters. The scaling of variables is very important when performing cluster analyses because when different scales are used the results can be misleading. Hence, all variables were converted into standardised Z scores before the cluster analysis was carried out.

The method of choice was the Ward hierarchical method because it minimises the within-cluster differences and avoids problems with "chaining" of observations found in the single linkage method (Hair et al., 1998). To determine the number of clusters, the Agglomeration schedule coefficients were inspected. According to Norusis (1992), small coefficients indicate that fairly homogenous clusters are being merged. In contrast, large coefficients indicate that clusters that contain quite dissimilar members are being combined. In deciding the number of clusters needed to correctly represent the data, it is necessary to look at fairly large increases in the coefficients between two adjacent sets.

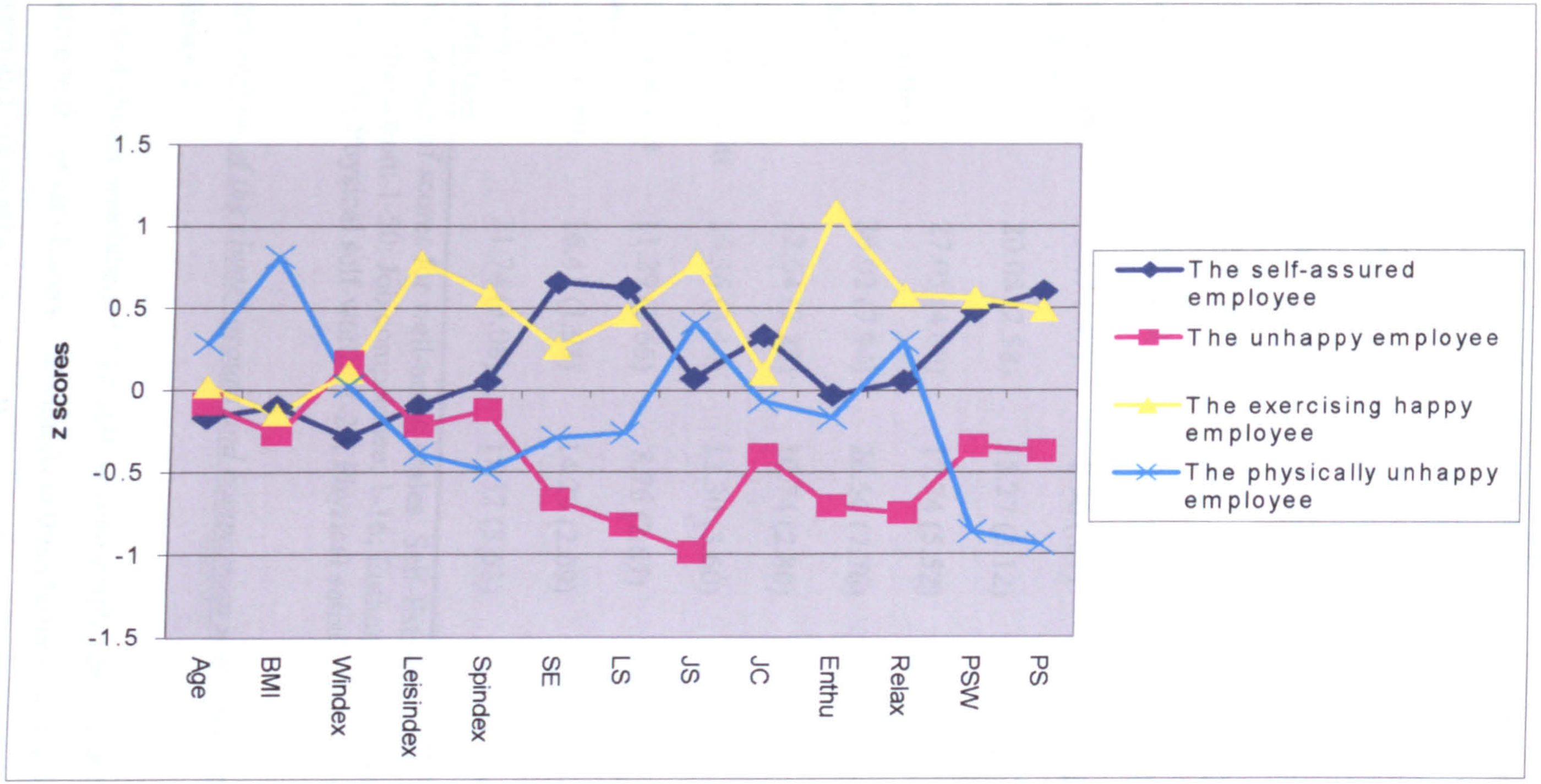
The variables from the JAS which measured negative states at work were not included in the cluster analysis, as the focus of the study were on the presence of positive psychological states. However, these two variables were used to statistically validate the clusters (see “Cluster solution validation” below).

RESULTS

Cluster Analysis

An inspection of the Agglomeration schedule revealed that there was a large increase in the coefficients from a four-cluster to a three-cluster solution. It was therefore concluded that the best summary of the data was found with four distinct clusters (see Figure 4.1). The unstandardised means and standard deviations of the variables used to create the cluster solution are presented in Table 4.1. In what follows, the means of each cluster group, which is subjectively labelled to represent their meaning, will be compared to established normative data to the extent that these exist (they do not exist for physical satisfaction and job affect).

Figure 4.1. Physical activity and well-being clusters (all scores are standardised)



WB=Well-Being, PA=Physical Activity, PWB=Physical Well-Being, BMI=Body Mass Index, Windex=Work Index, Leisindex=Leisure-Time index, Spindex=Sport and exercise index, SE=Self-Esteem, LS=Life Satisfaction, JS=Job Satisfaction, JC=Perceptions of Job Competence, Enthu=Enthusiasm at work, Relax=Relaxation at work, PSW=Physical Self-Worth, PS=Physical Satisfaction

Table 4.1. Means (M) and Standard Deviations (SD) of the variables used for each cluster

	1) The self-assured employee	2) The unhappy employee	3) The exercising happy employee	4) The physically unhappy employee
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Age	32.80 (6.66)	33.40 (8.50)	34.29 (7.97)	36.38 (8.50)
BMI	24.05 (2.91)	23.39 (2.89)	23.86 (2.80)	27.65 (5.89)
Work index	2.20 (.23)	2.33 (.34)	2.31 (.28)	2.29 (.28)
Leisure-time index	2.81 (.60)	2.72 (.63)	3.42 (.76)	2.60 (.56)
Exercise and sport index	3.07 (.49)	2.96 (.67)	3.39 (.48)	2.74 (.50)
Self-esteem	20.08 (2.58)	15.27 (3.12)	18.61 (2.91)	16.64 (3.95)
Life satisfaction	27.05 (4.00)	17.74 (5.52)	26.03 (4.77)	21.40 (5.92)
Job satisfaction	36.02 (7.94)	26.56 (7.76)	42.45 (4.78)	39.18 (5.26)
Job competence	12.64 (2.23)	10.74 (2.80)	12.05 (2.15)	11.60 (2.68)
Enthusiasm at work	16.36 (3.44)	13.30 (3.60)	21.21 (3.30)	15.62 (3.23)
Relaxation at work	11.29 (2.66)	8.76 (2.67)	12.94 (2.59)	12.02 (2.76)
Physical self-worth	16.41 (1.93)	14.29 (2.09)	16.64 (1.97)	13.11 (2.08)
Physical satisfaction	21.74 (3.08)	17.32 (3.63)	21.28 (3.66)	14.82 (4.08)

Note. Range of scores for well-being scales: Self-Esteem: 1-24; Life Satisfaction: 1-35; Job Satisfaction: 1-50; Job competence: 1-16; Enthusiasm at work: 1-30; Relaxation at work: 1-20; Physical self-worth: 1-24; Physical satisfaction: 1-30

A description of the cluster groups and comparison with established norms

Cluster 1

The first cluster was labelled "the self-assured employee" (*N*=87; 29.59%) because relative to the other clusters, individuals in this cluster reported high levels of self-esteem and life satisfaction, as well as reporting being very satisfied with the physical aspects of themselves (i.e. health, weight, shape and appearance). In addition, their

mean scores on physical activity were moderate. Table 4.1 illustrates that, not only does this cluster exhibit a high level of global well-being compared to the other clusters in this study, but also in absolute values. Compared to normative data with the SWLS, this group's mean level of life satisfaction (M = 27.05) is considered in the range "satisfied" (Range = 26-30; Pavot & Diener, 1993). Mean levels of self-esteem (M = 20.08) are similar to norms produced by Messer and Harter (1986; M = 19.86-20.40) based on full-time working women. However their perceptions of job competence (as a domain of self-esteem) are notably lower (M = 12.64) than the norms published by Messer and Harter (1986; M = 14.24-14.44). Despite the lower level of perceptions of competence at the job, mean levels of job satisfaction (M = 36.02) are higher than two (M = 34.45 and M = 34.95) out of three (M = 37.70) very different samples of employees based on the modified version of the job satisfaction scale by Judge et al. (1998). Furthermore, levels of enthusiasm (M = 16.36) and relaxation at work (M = 11.29) are above the mid-point of their respective scales. Based on normative data, this cluster's mean level of physical self-worth (M = 16.41) is comparable to the mean level of males in a student population (M = 16.66-17.40; Fox, 1990) and a general adult population (M = 16.89; Sonstroem, Speliotis, & Fava, 1992), and substantially larger than the mean of PSW for obese males and females (M = 10.60-13.40; Fox, 1990). In addition, levels of physical satisfaction are high as expected, with a mean of 21.74 out of a maximum of 30. It is interesting to note that, although this cluster may be described as moderate on physical activity indices *compared to* the other cluster groups, it is clear from normative data by Baecke et al. (1982; Work: M = 2.6-2.9; Sport/Exercise: M = 2.4-2.8; Leisure-Time: M = 2.8-3.1), that this cluster's level of participation in sport and exercise activities (M = 3.07) is substantially higher.

Cluster 2

The second cluster was called "the unhappy employee" (N=86; 29.25%) because these employees were very dissatisfied with their lives and had low levels of self-worth, in addition to being dissatisfied with their jobs and showing low levels of positive affect at work. The means shown in Table 4.1 reveals that this group may be categorised as being "slightly dissatisfied" with life (M = 17.74) according to Pavot and Diener (Range = 15-19; 1993). Their levels of self-esteem (M = 15.27) are much lower, approximately

by one point less on the scale, than norms produced by Messer and Harter (1986), as are their perceptions of job competence (M = 10.74). With regard to this cluster's level of job satisfaction, it is interesting to note that it is dramatically lower (M = 26.56) than three very different samples of employees assessed by the modified version of the job satisfaction scale (Judge et al., 1998). Perhaps not surprisingly, their levels of enthusiasm and relaxation at work during the week they replied to the questionnaire are less than fifty percent of the maximum of the scale. According to norms of PSW, this cluster's level (M = 14.29) is lower than most normative student samples, except for one female sample (Fox, 1990; M = 13.60). It is substantially higher, however, than PSW of obese people (Fox, 1990), and a sample of adult psychiatric in-patients (Van de Vliet et al., 2002). Finally, levels of physical activity are more or less similar to norms produced by Baecke et al. (1982), except that, on average, they engage in slightly more sport and exercise activities (M = 2.96).

Cluster 3

The third cluster was named "the exercising happy employee" (N=66; 22.45%) because these participants were doing a comparatively high amount of leisure-time physical activity as well as structured exercise and sports. In addition, this group reported high levels of satisfaction with their jobs and felt a high level of enthusiasm and relaxation at work. Indeed, it is clear based on normative data, that this cluster is very physically active. With mean levels of 3.42 and 3.39 for leisure-time and sport/exercise, respectively, it is much higher than published norms by Baecke et al. (1982) on these two physical activity indices. Based on normative data, this group is also considered "satisfied" with their lives (Pavot & Diener, 1993) with a mean of 26.03. In contrast, their levels of self-esteem (M = 18.61) are, perhaps surprisingly, lower than norms based on both female and male samples of full-time employees as are their perceptions of job competence (M = 12.05) (Messer & Harter, 1986). However, levels of job satisfaction (M = 42.45) are overwhelmingly high, also compared to results by Judge et al. (1998). Perhaps as a result, levels of enthusiasm at work (M = 21.21) and relaxation (M = 12.94) are several points above the mid-line of both scales. The cluster's level of PSW (M = 16.64) is nearly identical to a normative sample of male college students (M = 16.66; Fox, 1990) and an adult sample (M = 16.89; Sonstroem et al., 1992).

Cluster 4

The employees in the fourth cluster, called "the physically unhappy employee" (*N*=55; 18.71%) were relatively overweight, and perhaps as a result, had a low level of physical self-worth and physical satisfaction compared to the other groups. Interestingly, these employees were also the least physically active. Physical activity levels in this group may be considered lower on work index ($M = 2.29$) and leisure-time index ($M = 2.60$), and although their sport/exercise index is the lowest among this sample ($M = 2.74$), it is actually higher than the norms produced by Baecke et al. (1982). BMI ($M = 27.65$) may be considered overweight, but does not meet the threshold for obesity defined as a BMI>30 (i.e. 30 kg/m^2 or more). An inspection of the mean of this cluster ($M = 21.40$) on life satisfaction in Table 4.1 shows that this group may be considered "slightly satisfied" with life (Pavot & Diener, 1993). In addition, levels of self-esteem ($M = 16.64$) and perceptions of job competence ($M = 11.60$) are substantially lower than norms produced by Messer and Harter (1986). In contrast, the mean level of job satisfaction in this group ($M = 39.18$) is larger than results from three different samples by Judge et al. (1998). In addition, enthusiasm ($M = 15.62$) and relaxation ($M = 12.02$) at work are above the mid-point of the scale. Finally, however, PSW ($M = 13.11$) is lower in absolute terms compared to normal-weight normative samples of males and females ($M = 15.83$; Van de Vliet et al., 2002), and comparable to the norms of an obese male population (Fox, 1990; $M = 13.40$). As expected, therefore, mean levels of physical satisfaction are also just below the mid-point of the scale ($M = 14.82$). This group therefore represents overweight, relatively inactive people with a not very positive view of themselves.

Cluster description on gender

The number and percentages of each gender in the clusters are presented in Table 4.2.

Table 4.2. Gender distributions in each cluster

	Males		Females	
	n	%	*n*	%
1) The self-assured employee	63	30.88	24	22.22
2) The unhappy employee	54	26.47	32	29.63
3) The exercising happy employee	47	23.04	19	17.59
4) The physically unhappy employee	32	15.69	23	21.30

Note: Percentages are calculated based on percentage of the respective gender group

It is interesting to note from Table 4.2, that the largest group of males were categorised as being self-assured, whereas the largest percentage of women were located in the "unhappy employee" cluster. However, a Chi-Square analysis was carried out, and it was shown that there was no significant difference between males and females on distribution in the clusters (Pearson Chi-Square (3) = 4.27; $p > .05$).

Cluster description on job profiles

The characteristics of the clusters in terms of job profiles were analysed and the results are seen in Table 4.3.

Table 4.3. Job title distribution in the clusters

	Total Sample	1) The self-assured employee	2) The unhappy employee	3) The exercising happy employee	4) The physically unhappy employee
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Manager/ Supervisor	41 (13.23)	14 (16.09)	9 (10.47)	11 (16.67)	5 (9.09)
Engineer	88 (28.39)	28 (32.18)	24 (27.91)	18 (27.27)	14 (25.45)
Specialists/ Analysts	55 (17.74)	19 (21.84)	14 (16.28)	13 (19.70)	7 (12.73)
Production/ Technical staff	19 (6.13)	4 (4.60)	5 (5.81)	4 (6.06)	5 (9.09)
Office/clerical	33 (10.65)	7 (8.05)	11 (12.79)	4 (6.06)	8 (14.55)
Others	74 (23.87)	15 (17.24)	21 (24.42)	16 (24.24)	16 (29.09)

Note: For the individual clusters, the percentages refer to the proportion of the total cluster

Table 4.3 shows that a relatively high number of office/clerical workers taking part in the study had low levels of well-being (i.e. were unhappy) compared to the other groups (a percentage of 33.3% of all clerical participants). Only 9 of 41 managers (21.95%) reported low well-being, possibly reflecting more favourable levels of personal control at the job. However, a Chi-Square analysis was carried out which showed that there was no significant differences in job title distribution between the four clusters (Pearson Chi-Square (15) = 11.16; $p > .05$).

Cluster solution validation

After establishing the number of clusters, it is useful to employ an appropriate validation procedure to ensure that the cluster solution has external validity. Aldenderfer and Blashfield (1984) suggested that the most appropriate validation technique is to compare the clusters on variables *not* used to create the cluster solution. This external validation procedure selects variables of theoretical and practical importance and uses them as a benchmark for validating the cluster solution. The variations in negative affective states at work between the different cluster groups were examined in the present study in the process of validating the cluster solution. It was hypothesised that the cluster groups with the most favourable profiles in terms of well-being would have significantly lower levels of negative affect at work within the past week compared to clusters with low levels of well-being.

A one-way MANOVA test was carried out with the four cluster groups serving as the grouping variable and the two validation variables serving as the dependent variables. The MANOVA was significant: Pillai's trace = .196, F (6, 580) = 10.52, $p <$ .001. The univariate tests showed that both validation variables differed significantly between the clusters. Post-hoc tests with Bonferroni adjustment revealed significant differences among the groups. Specifically, participants in "The unhappy employee" cluster were significantly more nervous and fatigued at work compared to the other groups (see Table 4.4).

Table 4.4. Means (M) and Standard Deviations (SD) on nervousness and fatigue at work for each cluster

	1) The self-assured employee	2) The unhappy employee	3) The exercising happy employee	4) The physically unhappy employee
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Nervousness at work	9.74 (3.19)	13.34 (5.05)	9.56 (3.91)	9.78 (3.63)
Fatigue at work	8.43 (2.58)	10.69 (3.90)	7.56 (2.66)	8.83 (3.03)

Note. Range of scores for each sub-scale: Nervousness at work: 1-30; Fatigue at work: 1-20

Table 4.4 shows that "The exercising happy employee" group had the most favourable scores (i.e. lowest scores) on the negative job affect variables. This makes sense and could be expected, as those employees who are the happiest would also be more likely to be the ones who are the least likely to experience high levels of negative affect. In conclusion, then, the above analysis supported the validity of the clusters formed.

DISCUSSION

The purpose of the present study was to examine the number and structure of physical activity and mental well-being clusters in a sample of corporate employees. Four distinct clusters emerged, were described in terms of gender and job profile distribution, and the cluster solution was subsequently validated on measures of nervousness and fatigue at work. Comparing the means of the cluster groups on the variables used to form the clusters with existing norms, produced by authors of most questionnaires (self-esteem and perceptions of job competence, life satisfaction, job satisfaction, physical self-worth and physical activity) allowed for an evaluation of the true nature of the physical activity and well-being profiles of the individual clusters.

Indeed it was shown that the structure of the cluster profiles were very different. The first cluster "The self-assured employee" clearly seemed to consist of employees who were functioning well in life, given their high levels of self-esteem and life satisfaction, two constructs that are considered essential to well-being (Diener et al., 1998). Interestingly, although this cluster's level of job satisfaction was high compared

to norms, perceptions of job competence were not. This is a curious finding, considering this cluster's high mean level of self-esteem. However, it seems that the high levels of self-esteem seen for this group are the result of high levels of self-perceptions specific to other domains in life. This is in agreement with conceptualisations of self-esteem as a global estimate of worth determined by subjectively more or less salient perceptions in a vast range of areas of life, many of which do not relate to one's work life (Harter, 1990). An alternative explanation involves the possibility that this cluster of employees exhibits a high level of true self-esteem, in which perceptions of worth are not contingent upon achievements in life, but is more inherent within the self (Deci & Ryan, 1995). Follow-up work could try to establish the nature of self-esteem structure for some individuals in this cluster. Specifically, it would be useful to adopt qualitative approaches, as self-esteem questionnaires do not easily discriminate between different types of high levels of self-esteem.

Compared to the other clusters, these employees also exhibited high levels of physical satisfaction. It is likely that one reason for this finding is that this group engage in a higher amount of sport and exercise activities, compared to norms established by Baecke et al. (1982), and as a result they may be more satisfied with physical aspects of themselves. Although causality was not tested in the present study, previous research has found support for a positive effect of physical activity on levels of physical satisfaction using a variety of measures (Yarnold et al., 1995; King et al., 1989). The relatively large percentage of employees in this cluster (29.59%) is promising given the apparent favourable emotional adjustment properties associated with membership in this cluster.

The second cluster "The unhappy employee" is clearly identified as consisting of individuals who are struggling both inside and outside work. Compared to established norms, this cluster group is slightly dissatisfied with life, have low levels of self-esteem, and low perceptions of competence at work. In addition, levels of job satisfaction are very low compared to standards, as are levels of positive affective states at work. It is likely that for this cluster, unhappiness in both aspects of life spill over into each other to create a negative cycle. Previous literature has established an average correlation between job satisfaction and life satisfaction of $r = .35$ (Tait, Padgett, & Baldwin, 1989), which support a spill-over effect. In addition, however, it is also important to

consider the notion of levels of job involvement and job centrality to understand how work-related well-being and life satisfaction may relate (Warr, 1999).

Physical self-worth and satisfaction is also low for this cluster compared to norms, even if it was revealed that sport and exercise activity is higher than what could have been expected based on results from Study 1. This result suggests that not all employees benefit equally well from physical activity and exercise participation. Indeed, it is generally acknowledged that exercise is not a panacea for work-related problems, but may work for some as a secondary prevention strategy, i.e. as a means of altering the way in which individuals perceive and respond to stressors at work (Campbell Quick, Murphy, Hurrell, Jr., & Orman, 1992). However, only more in-depth qualitative research methods may provide some further insight into the reasons why exercise may not relieve symptoms of distress for employees in this cluster.

The cluster "The exercising happy employee" consists of very physically active individuals, who engage in a lot of exercise and sport activities, also compared to norms (Baecke et al., 1982). Linked with that is an exceptionally high level of job satisfaction, enthusiasm and relaxation at work. Perhaps as a result, they are satisfied with their lives, and there might be a positive spill-over between work and life satisfaction. Surprisingly, the mean of this cluster's self-esteem is below the published norms by Messer and Harter (1986), as are their perceptions of job competence. This finding again illustrates the diversity of combinations of well-being profiles, and identifies some previously undiscovered structures of well-being.

Between the four cluster groups identified, this cluster and the cluster "The self-assured employee" have well-adjusted healthy profiles, but given the different profiles of the two groups, it could be argued that their well-being profiles originate from different sources. For example, the first cluster ("The self-assured employee") has high levels of global well-being on both life satisfaction and self-esteem. In addition, they have high absolute levels of job satisfaction, but their perceptions of job competence are lower than published norms (Messer & Harter, 1986). As already argued, it seems that this group's high level of self-esteem may originate from areas outside of work, and therefore their work identities may not be of utmost importance to their sense of self. It would therefore also be interesting to examine the relationship between job- and life satisfaction in this group. The nature of this relationship could be examined using in-

depth qualitative methods of data collection with the particular individuals in the cluster. In contrast, it is possible that the "exercising happy employee" cluster derive their high levels of life satisfaction from their satisfaction with their work. Again, it would be useful to get more in-depth information about this link for people in this cluster.

Finally, the cluster "the physically unhappy employee" may be considered a group of overweight employees, who notably feel unhappy about their physical attributes. It is very interesting to note the structure of this particular cluster's well-being profile. First, it appears that although their level of life satisfaction ("slightly satisfied") may be considered moderate, their job satisfaction is above the mean of three independent samples studied by Judge et al. (1998). This indicates again that the job may play an important role in the lives of these employees, but may not be the most important aspect. Again, qualitative research would clearly help to determine some of the causes of life satisfaction for this group. Secondly, levels of self-esteem (global, perceptions of job competence and physical self-worth) are low compared to norms (Messer & Harter, 1986; Fox, 1990) which may or may not be explained by their overweight.

Although employees in this cluster compared to the remaining clusters engaged in the smallest amount of physical activity, their absolute levels of exercise and sport involvement surpassed norms produced by Baecke et al. (1982). This is encouraging from a public health point of view, as previous research has documented that, in general, overweight and obese individuals engage in less physical activity than their leaner counterparts (e.g. Martinez-Gonzalez et al., 2001).

It should be noted that the number of employees in "the unhappy employee" cluster group was larger than the number in "the exercising happy employee" cluster. This demonstrates the relatively high prevalence of people with a general malaise who should be specifically targeted in organisations' attempts to improve the well-being of their employees. In fact, both of the clusters "the unhappy employee" and "the physically unhappy employee" could be characterised as having unfavourable profiles of well-being, amounting to a total of 47.96% of the total sample.

Clearly, cluster analysis is imperative because it enables the identification of employees who are in particular need of enhancing their levels of well-being. In turn, by

identifying these employees, the organisations could make more cost-effective wellness programmes for its employees.

The results from the cluster analysis show that the link between physical activity and mental well-being of corporate employees may not merely be characterised in a uni-dimensional fashion, i.e. high PA and high well-being versus low PA and low well-being. Instead, the results show that for some employees who are moderately physically active, their global well-being (i.e. life satisfaction and self-esteem) is high, and in contrast their work-related well-being (i.e. job satisfaction, perceptions of job competence, and positive affect) is moderate. However others, who tended to be overweight, but who did moderate amounts of physical activity, have low levels of physical well-being, but have moderate levels of global well-being. Still others are also moderately physically active, but have low levels of well-being, also in absolute terms. These findings provide some new evidence to suggest that we cannot assume that the relationships between exercise and mental well-being for a corporate population are straightforward. Instead, it seems imperative that we look into the individual differences that may exist among smaller groups of employees when we aim to establish exercise or wellness programmes designed to increase their levels of mental well-being. To my knowledge, no prior study examining the nature of the relationship between physical activity and employee well-being have been able to demonstrate the significance of comparing individual groups to enhance the understanding of this relationship. Future research, however, should look into a range of determinants of cluster memberships in this population.

The main limitation of the present study, as in Study 1 was the possibility of a biased sample, when taking into consideration the low response rate (33.19%), and the high levels of physical activity. However, because this study showed that employees within this sample had substantially distinct well-being profiles, it is most likely that a sample which is more representative of the population would show even more distinct profiles than found here. Obviously, a study of this nature would benefit from being replicated with employees with different characteristics, especially examining employees who are less active than participants in this study. In addition, although cluster analysis provides a typology of individuals and some homogeneity exists within cluster groups, individuals within the cluster groups likely exhibit some degree of

difference, and it would be useful to use alternative methods to examine further the validity of the cluster groups.

According to Shephard (1992, 1996a), one of the essential elements of modification to enhance the cost-effectiveness of employee exercise programmes is to increase participation rates substantially. The problem is that, often, the small fraction of employees who do take part in these programmes are already physically active outside the confines of the work environment (Leatt, Hattin, West, & Shephard, 1988). It is likely that the inability to attract to these programmes employees who are physically and mentally "at risk" is partly due to ineffective means of targeting them. It is suggested that cluster analysis provides a promising means of identifying "at risk" populations, a suggestion that is supported by previous research examining health-related behaviours (De Bourdeaudhuij & Van Oost, 1999).

General comments

The cluster analysis carried out in Study 2 gives some important insight into the structure of profiles within one corporate population, and points out the importance of targeting employees when examining in depth the relationship between physical activity and mental well-being. However, as stated previously, the cluster groups established in this study are likely to exhibit some degree of intra-group variation. It would therefore be useful to examine the validity of the established clusters using idio-graphic approaches to data collection. Unfortunately, the scientific literature is generally replete with attempts to make a split between quantitative and qualitative research efforts. Although some would argue that an integration of the two betray the foundations of each paradigm, it may also be argued that an integration of the two can inform each other by answering different sorts of questions relevant to the particular research objective (Dreher, 1994). If it can be established that clusters provide a good group representation, it could have useful implications for the design and implementation of strategies to use exercise as a means of enhancing employee well-being. A study based on semi-structured interviews may enrich the information about cluster membership, determining some of their underlying factors within the individual. This step should involve the examination of some of the processes of change that operate over time, and

therefore by definition the investigation of the stability and changeability of the constructs used to form the cluster analysis.

CHAPTER FIVE

STUDY THREE: CONFIRMATION OF CLUSTER MEMBERSHIPS AND ILLUMINATION OF MECHANISMS LINKING EXERCISE WITH WELL-BEING USING A QUALITATIVE APPROACH

The cluster analysis carried out in Study 2 was used to establish physical activity and well-being typologies among a group of employees. The findings suggested that multidimensional relationships exist between exercise and mental well-being. Specifically, four distinct clusters were found, described, and statistically validated. However, as mentioned in Study 2, some intra-group variation will exist, and given the centrality afforded to cluster analysis as a targeting approach throughout the present thesis, it may be useful to find alternative methods of confirming (or disconfirming) the existence of typologies. Despite an ongoing controversy of the appropriateness of mixing methods, and hence, it is believed, epistemological assumptions, it is also clear that methods do not equal paradigms (Sparkes, 1992). Instead, it may be possible to mix methods if required by the research question. Indeed, in line with an increasing focus on post-positivism, the research question may determine our means of inquiry.

Although to my knowledge there have been few efforts to complement a cluster analysis with alternative means of data collection and analysis, the integration of findings from different methods can enhance confidence in the results, and thereby in the usefulness of the targeting approach adopted in the present thesis. This integration of findings from various methods is akin to the concept of triangulation, which is based on the logic that different methods are better at providing a complete solution to a research problem than any one method by itself (Denzin, 1971). Specifically, methodological triangulation examines the consistency of findings using different data collection methods, and its aim is to gain a more comprehensive perspective of the setting or people being studied (Morse, 1994).

One way of addressing the intra-group variation in the clusters is to examine individual experience. It has been suggested that particular dimensions of some well-being constructs may best be illuminated through idiographic approaches. For example, it has become evident that it is not sufficient to examine low versus high self-esteem that is measured through questionnaires, but high self-esteem may be further divided into true versus contingent self-esteem. Having contingent self-esteem implies that self-esteem is dependent upon reaching some extrinsic goal, whereas true self-esteem is much more inherent within the self and therefore more stable (Deci & Ryan, 1995). In addition, researchers examining the relationship between subjective well-being, resources and personal strivings have promoted the use of alternative, or idiographic

approaches to data collection, because aggregating scores across individuals does not take into account individual differences in resources and goals (Diener & Fujita, 1995).

Although a focus on individual experience does not allow me to generalise the findings to a wider population, it may allow me to explore issues that relate to cluster membership in more depth. Taking a qualitative approach to data collection and analysis appears to be one of the best ways of exploring individual lived experience. Indeed, one of the great strengths of qualitative research, according to Sofaer (1999), is the ability to explore the meanings ascribed to events by the *participants*, which may, in turn, enhance the understanding of individual realities and relationships.

An added feature of the present study is an eight month time delay between questionnaire administration and carrying out interviews. This time delay not only allowed me to identify the participants for the interviews, developing the interview guide etc., but may also provide a dynamic perspective to the analysis. It is clear that an individual's profile may change over time, which may account for any discrepancies between the cluster profiles and the individual's account eight months later. In other words, the approach will allow me to explore some of the processes of change in well-being. In view of the above, the first purpose of the present study was to examine whether the solution could be confirmed using an alternative approach to data collection and analysis.

One of the other great strengths of qualitative research, such as interviews, is its ability to examine "why" questions, or mechanisms, because they are often rich on contextual information. Indeed, one of the major strengths of qualitative approaches to data collection is that they enhance our ability to understand why and how certain events are often interpreted differently, even conflicting, by different people (Sofaer, 1999). Miles and Huberman's quote (1994) illustrates the appropriateness of using qualitative data in a study examining mechanisms of change:

> "We consider qualitative analysis to be a very powerful method for assessing causality...Qualitative analysis, with its close-up look, can identify mechanisms, going beyond sheer association. It is unrelentingly local, and deals well with the complex network of events and processes in a situation. It can sort out the temporal dimension, showing clearly what preceded what, either through direct observation or retrospection" (p. 147).

Specifically of relevance to the present study is the question of why exercise may work to enhance well-being. These mechanisms have yet to be determined (Fox, 2000).

As discussed in Chapter 2, generic psycho-physiological and psycho-biochemical hypotheses as appropriate explanations for the link between exercise and well-being have more recently been questioned as individuals respond differently to various exercise regimens (e.g. Rejeski, 1994). Instead, suggestions have been made that it may be the process of engaging in exercise that determines the effect of exercise on well-being (e.g. Fox, 1999), and several hypotheses have been suggested (see "review of literature"). However, despite clear hypotheses about these mechanisms, as yet, the amount of research which have examined these are very few and generally limited to quantitative studies (e.g. Tuson et al., 1995). To my knowledge there have been very few published studies which have used alternative qualitative methodologies, examining the mechanisms within different population groups. For example, a qualitative interview study by Hed (1997) indicated that mastery experiences, mood enhancement, stress-relief and coping, enhanced cognitive functioning, clarity and perspective, release and rejuvenation may account for any positive effect of exercise on well-being among general exercisers. In addition, in an ethnographic study, Faulkner and Sparkes (1999) examined why exercise may be beneficial for schizophrenic patients. They found that exercise may work to improve well-being through distraction and social interaction mechanisms. Qualitative research, for example in the form of interviews, may therefore provide a useful tool by which to investigate some of the psycho-social mechanisms that may operate on an individual level. Furthermore, as suggested by Fox (2000), in addition to establishing the nature of the mechanisms, it is important to understand more about the conditions under which any mechanism may work to explain the relationship, and an individual level approach to data collection and analysis appear to be one of the only ways of examining this question. To this end, the present study will aim to uncover ways in which exercise may, or may not, work to enhance well-being using case examples. It is hoped that a more in-depth understanding of how exercise and well-being components relate within the individual will allow for a more enriched understanding of the role of that exercise and the physical self play in affecting work-related as well as global well-being of selected members in a corporate population.

In view of the above, the main objectives of the present study were to:

1. Seek confirmatory support for the cluster solution in Study 2, through the use of individual accounts of experience. This includes examining how

constructs relate within the individual rather than at the group level, and an exploration of processes of change in well-being

2. Explore some of the psycho-social mechanisms that may explain the link between exercise participation and components of well-being using individual examples.

METHODS

In qualitative research, data collection and analysis is often an iterative process, whereby the researcher switches between the relevant literature and the data (Miles & Huberman, 1994). This approach was also adopted in the present study, but for the sake of clarity, procedures and analysis are presented separately.

Participant selection

Ten semi-structured interviews were carried out with specially selected participants from the previous study to obtain confirmatory information with regard to the cluster profiles, and an illumination of mechanisms of change linking exercise with elements of well-being.

Method of selection

A judgement sample was selected to ensure that critical cases were chosen for the interviews (Bernard, 1994). Indeed, according to Rubin and Rubin (1995), it is important to have a balanced range of study participants in order to represent various dimensions of experience. The cluster analysis in Study 2 clearly identified individuals in each cluster group.

There are no clear guidelines regarding the number of participants to include in such a study. However, the rationale for the number of participants chosen was based on one main consideration. To illustrate how the individual participant fitted the typology description from the cluster analysis, and given the space and time restrictions, the number of cases that could be analysed was limited. At the same time, however, it was necessary to include individuals from each cluster group. As a consequence, it was decided that a minimum of two individuals from each cluster should be chosen.

The ten interviews were carried out with five female and five male employees, who represented key cases from each of the four cluster groups. The first two interviews which were carried out initially served as pilot interviews, given the lack of personal experience I had with carrying out qualitative research. However, a decision was made later to include the pilot interviews in the main study, as it was felt that they provided enough useful information to be analysed separately. Therefore, the cases represented 2 males and 2 females from Cluster 1: "The self-assured employee", 1 male and 1 female from Cluster 2: "The unhappy employee", 2 females from Cluster 3: "The exercising happy employee", and 2 males from Cluster 4: "The physically unhappy employee". It should be noted here that, unfortunately, males from cluster 3 and females from cluster 4 were either not available or did not wish to be interviewed.

Inclusion criteria

Participants were selected based on the following criteria in order to provide a reasonable representation of experiences:

1. Willingness to be interviewed. At the end of the questionnaire, participants had the option of indicating whether they would be willing to be interviewed as a follow-up to the questionnaire.
2. Type of physical activity and well-being profile according to the method of selection described above.
3. Gender.
4. Age. An effort was made to choose participants who represented different age groups to get a fuller range of experience.

The study setting

The topic of the interviews which were carried out was relatively delicate, which was kept in mind throughout the data collection process. Although the interviews took place at the workplace of the employees, a room was designated specifically for the purpose, and blinds and a closed door served to protect the interviewee from interruption. None other than myself knew any of the names of the interviewees. In addition, although several interviews took place on the same day, adequate time was allowed in between

interviews so that none of the interviewees met. However, despite these efforts to make the individual interviewee feel as comfortable as possible with the situation, it is very likely that the fact that the interviews took place at the worksite may have affected the answers of the interviewees.

Apart from any potential impact of the physical surroundings, it is important to note the changing status of the company in the time between the survey and the interviews. Specifically, the organisation was in the process of merging with another major company. As a result, some redundancies had taken place in the corporation, which generated cause for concern among some of the employees. This should particularly be seen in the light of the performance appraisals that had also just been carried out prior to the interviews. A few interviewees described the impact this had on their well-being. It seemed to have caused a lot of job insecurity among some of the employees.

Procedures

Those participants who were willing to be interviewed had written their e-mail address at the end of the questionnaire that they submitted eight months previously, so that it was possible for me to locate them if needed. Based on the inclusion criteria mentioned above, candidates for the interviews were contacted via e-mail approximately seven months after the questionnaire survey. Approximately two weeks were dedicated to the interviewing process, and interview rooms were booked at the work-site of the employees through a contact person (who did not know the identity of the participants). Two to three semi-structured interviews were carried out in one day, but leaving plenty of space in between interviews to reflect on rapport with the individual interviewee etc. The longest of the interviews lasted approximately forty minutes and the shortest twenty-five minutes. A conscious decision was made not to keep the interviews too long, as the interviews took place during work time.

Due to the semi-structured nature of the interview guide, a pre-determined set of questions were constructed, which served as a checklist during the interview to ensure that all the participants were asked the same questions. However, a great deal of flexibility was incorporated into the interviews in order to pursue any emerging issues

in greater depth. All interviews were recorded on audiotape and subsequently transcribed verbatim.

Interview guide

The interview guide (see Appendix 3) consisted of 4 sections:

1. Questions to establish rapport and learn about jobs
2. Relationships among well-being variables: Laminated signs were used to ask respondents how they perceived the relationships among the well-being variables proposed in the model in Study 1. The purpose of this section was to increase my understanding of these relationships.
3. Physical activity habits and exploring psycho-social mechanisms explaining the relationship between physical activity and mental well-being. In this section of the interview, participants were asked about their physical activity habits, and, through the use of the laminated signs, illustrate how they related to the different elements of well-being. This section mainly served to answer the second objective of the study, as the purpose of this section was to explore some of the potential mechanisms explaining the link between exercise participation and different components of well-being (objective 2).
4. Level, sources, and changes in well-being: The purpose of this section was to understand more about the level and sources of well-being for each participant, and to examine whether any changes in well-being had taken place since the time of replying to the questionnaire, and the reasons for any potential change. This section was key in seeking confirmatory support for the cluster profiles of the individual participant (objective 1).

Analysis

The unit of analysis in the present study was the individual cluster member. Although the interviews that were carried out cannot be described as full case studies as they did not provide a true dynamic perspective, it was decided early on that the analysis of the interviews should follow a case-specific approach, rather than a thematic approach. The advantage of a case-specific approach is that it provides more detail, as the case has been labelled a "functioning specific" by Stake (1994). Stake (1994) has also suggested that case studies serve different purposes, as they are either intrinsic or instrumental. For

the purposes of this study, a case study approach was adopted for instrumental reasons. According to Stake (1994), although the actual case itself is a key feature in the study, the major aim is not to study the case in and of itself, but to use the case in order to gather insight into a particular issue. In other words, the case is facilitating the understanding of the issue under study. This approach appeared to be suitable in the present study in which the interview with the case (i.e. participant) was used to seek confirmatory support for the cluster solution established through statistical means in S Study 2.

Types of qualitative analyses range along a continuum from a low level of interpretation and abstraction, to a very high level of interpretation and abstraction. In the present study, an "interpretive-descriptive" approach was taken (Maykut & Morehouse, 1994), in which the main focus is on the description of what the researcher has understood based on the information provided by the participants to reconstruct a "recognizable reality" for the participants (Strauss & Corbin, 1990). The researcher's own interpretations, however, is also interwoven into the analysis.

According to Guba and Lincoln (1981), the researcher carries out actions in the analysis of the data that fit with the type of case study that he or she has decided to carry out (factual, interpretative, or evaluative). For the purpose of the present study, the case studies largely fit in with the interpretative case study, and the actions of the researcher here include recording, constructing, and producing an individual profile, and construing, clarifying, and producing meanings of experience (Zucker, 2001). In addition, as suggested by Miles and Huberman (1994), after each interview, a short summary of the case was made to facilitate analysis.

According to Yin (1994), the case study questions form the heart of the method and the main function of the questions is to keep the researcher focused on the task at hand. Based on the study questions, categories of analysis were determined (see Table 5.1).

Table 5.1. Pre-determined categories for the interview analyses

Categories
Sources of potential stress
Sources of life satisfaction
Sources of self-esteem
Causal paths between well-being variables
Processes of change in well-being
Exercise as a means of improving well-being

After each interview had been transcribed verbatim, the transcript was subsequently coded according to the pre-determined categories in the margins of the transcript. Subsequent to the initial coding, the transcripts were re-examined, and relevant literature was revisited in between to get a more thorough understanding of any data that had not yet been coded. Sub-categories for each participant were also developed inductively from the data for each individual, which is in accordance with general inductive approaches to data analysis. In other words, the data analysis was determined by the research objectives (a deductive approach), and by the extensive readings and interpretations of the raw data (the inductive approach) (Thomas, 2000). Simple maps of experience were produced for each individual as a data management tool. This step of the analysis served the purpose of describing the experience of the participant more fully.

One of the key purposes of qualitative research methods is to uncover meaning of the phenomenon under study. To this end, Miles and Huberman (1994) have described thirteen tactics. These tactics range on a continuum from descriptive to explanatory and from concrete to abstract. There are four groups of strategies according to Miles and Huberman (1994), and they are listed in Table 5.2.

Table 5.2. Strategies to generate meaning from qualitative data

What goes with what?	What's there?	Sharpen our understanding	See things and their relationships more abstractly	Assemble a coherent understanding of the data
Noting patterns	Making metaphors	*Making comparisons*	Subsuming particulars into the general	*Building a logical chain of evidence*
Clustering	Counting	Partitioning variables	Factoring	Making conceptual/theoretical coherence
Seeing plausibility			*Noting relations between variables* *Finding intervening variables*	

Note. The strategies that were used in the present study are shown in italic characters
Adapted from Miles and Huberman (1994)

Due to the interpretative-descriptive stance taken in the present study, more descriptive and concrete tactics for generating meaning from the data (the left of Table 5.2) were used. For example, although each individual was analysed separately, in certain cases, comparisons were made between individuals in order to sharpen my own understanding of how the individuals differed among each other. This could be between individuals within the same cluster group or between individuals from two different cluster groups. Likewise, given theoretical postulations and findings from Study 1, it was assumed that well-being constructs related in specific ways for the participants (e.g. that affective experiences caused increases in job satisfaction), and hence "Noting relations between variables" in the data was one of the strategies used to evaluate the meaning of the relationships among the dimensions of well-being variables for the individual case. For example, as will be shown in the results section, the meaning of work largely determined the effects that job satisfaction had on life satisfaction.

With regard to the second main aim of the present study, the examination of the mechanisms linking exercise with well-being, part of the analysing strategy was slightly different to that carried out for the confirmation of the cluster solution. Patterns of

relationships between well-being and exercise were noted in the margins of the text for each individual, and intervening variables were suggested based on prior knowledge of theory and empirical findings. In this way, categories of the function (or lack thereof) of exercise in the generation of well-being for the individual participant were developed.

An inherent issue within any interpretive effort are the issues of the interpreter's perspectives, assumptions and experiences which ultimately guide the nature of the findings. In other words, my own ideas about what constitutes important or unimportant data and my belief that exercise may cause improvements in well-being (partly due to my experience as an exerciser) shape my interpretations of the data. The importance, therefore, of turning my attention to aspects of the rigour of the research methodology adopted in the present study is therefore evident.

Trustworthiness

The term trustworthiness refers to the credibility, dependability, transferability, and confirmability of research, which are the qualitative parallels to the conventional criteria of internal and external validity, reliability and neutrality used in quantitative studies (Denzin & Lincoln, 2000). The strategies which were adopted in the present study to ensure most of these elements of trustworthiness are described in the following section.

Triangulation as enhancing the credibility of the research

Triangulation of data is often used to help to enhance the trustworthiness, and more specifically, the credibility, of any research project (Bailey, 1997). Methodological triangulation is the process of using different data collection techniques to answer a particular research question, and it is important in the validation and verification of research findings (Bailey, 1997). Hammersley and Atkinson (1983) explain that the reason why methodological triangulation enhances the validity of any research study is because each of the methods used may work to counteract the possible threats to the validity of the other method. Specifically, according to Bailey (1997) this type of triangulation involves "checking the consistency of findings generated by different data collection methods, such as a survey and an interview" (p. 147). In the present study, methodological triangulation served as the means by which the typologies could be

confirmed or disconfirmed through the interview accounts. More specifically, the characteristics of the cluster group were used as the means of comparison with the individual interview accounts. As a consequence, a large part of the analysis was guided towards the degree of fit between the different sources of information.

Attention to contextual detail and methods of recording and using data and as enhancing the dependability of the research

Dependability, in essence, is the degree to which changes in settings are accounted for in the study. Therefore, the researcher needs to describe the changes that are taking place in the setting when interpreting the findings of a study. The changes that happened in the organisation as mentioned above (see "The study setting") and other types of changes that happened in the participants' lives in the intervening months between the survey and the interviews were accounted for in the analysis. Indeed, contextual information was used to explain discrepancies between the cluster profiles and the interview accounts. Furthermore, the audio-tape recording of the interviews, the verbatim transcription, and appropriate use of the direct quotations also served to enhance the dependability of the study.

A description of negative instances as enhancing the confirmability of the research

There are various ways in which to enhance the confirmability of any research findings. In the present study, I actively sought exceptions to the findings for each participant. For example, exercise did not always produce beneficial effects in terms of well-being, and the interview accounts did not always match the cluster description. This was documented in the analysis of the study, and possible reasons for these negative instances were suggested.

RESULTS

Cameo/case description

Overall description of cluster 1: "The self-assured employee"

Members of this cluster describe themselves as being more satisfied with their overall lives. Their mean levels of life satisfaction ($M = 27.05$) are considered in the range "satisfied" based on normative data (Pavot & Diener, 1993). They have higher levels of self-esteem than their colleagues. On average, they are moderately satisfied with their jobs, and feel a moderate level of perceived competence in their job. They also have an average level of positive affect at work (enthusiasm, and relaxation) during the week they responded to the questionnaire. In addition, they are more satisfied with their physical selves (health, weight, fitness, appearance, shape, and sexual attractiveness) than their counterparts.

ALLAN

Allan (a pseudonym) was the first person I interviewed. He was approachable and keen to talk about his life, had a very positive outlook, despite some circumstances in his life being stressful. I believe his approach helped me to establish a positive rapport with him, and he seemed genuinely interested in the research I was doing. This all contributed to the interview being informative.

More specifically, Allan is a thirty-one year-old married man with no children. He works as a project manager, and has worked in the corporation for three years, having been eighteen months in his current job. Being a project manager, he is dependent on the work of his colleagues being done on time, which, he says, is often not the case these days. This promotes feelings of lack of control for him, as is illustrated in the following quote:

> "...if things go wrong, it is quite difficult, so even though I'm responsible for everything, I really have very little control of what's actually happening"

This seems to be part of the reason that Allan's satisfaction with his job is not optimal. Comparing his statements from the interview with the general description of the cluster, it is clear that his job satisfaction may actually be lower, but the discrepancy

between these levels is likely to be attributed to the fact that his job satisfaction has decreased over the past eight months. He explains that his lower level of job satisfaction is due to increased physical distance from his manager, and the changes that have taken place in the organisation over the past months. His lower level of job satisfaction has important implications for his well-being. For example, his questionnaire response indicated that he felt it was "very important" to be good at his job in order to feel good about himself. In addition, he stated in the interview:

> "...you spend a large proportion of your life doing all these things [work], so it needs to be satisfying...I would say if my work is getting me down, it does have a big impact on my life. If I'm not getting the satisfaction from my job, then it will affect my general mood and how things are going. So there is a strong correlation"

During the interview, it became clear that Allan's satisfaction with life had decreased during the past eight months, but he does still consider himself "pretty happy" with his life. Here, I can identify five different factors that may partly explain how he retains or can enhance his level of well-being.

First of all, even though he does not seem able to completely segregate his working life from his life outside work, he tries to balance the two. He explains how having this balance in his life relate to his life satisfaction and self-esteem:

> "...I think generally, if you've got a good job satisfaction and is happy with what you're doing, you feel like you're making progress, and also you can balance that with what's happening in your personal life, you would feel good about yourself, and if you feel good about yourself it's self-perpetuating, and then hopefully you'll end up doing better in your job, and things in your life would look better as well"

Secondly, when Allan talks about his personal life, and the factors that are important for him to increase his level of life satisfaction it is clear that the goals he sets himself are important. One of the things he mentions as being important to his level of life satisfaction is to get a better job. This is the reason that Allan is attending a demanding part-time course. He has high efficacy expectations that the added work will lead to a better life in the future. He shows his commitment to this goal, as he says:

> "...I'm not totally satisfied with my job at the moment, but then what I'm doing is I'm studying for this MBA, and I really see that as the key to...what's hopefully is gonna be a key to the future to help me get a better job, to help me to do what I really want to do"

According to Diener et al. (1999), commitment to goals provides the individual with a sense of personal agency, as well as a sense of structure and meaning to daily life. In addition, commitment to goals may also help the individual to cope with daily stress and thereby maintain well-being in times of adversity. I suggest that this may be another important mechanism by which Allan retains his level of well-being.

The sacrifice he makes to keep this goal particularly involves lack of time to do other things that are important to him. However, he says:

> "...it's like a two-year thing. I've got probably a bit over a year to go, and then hopefully things will start getting better, so it's only short-term constraints and I should move on in the future"

It may be seen from Allan's statement that he is hopeful about the future and has the resources to look forward and feeling positive about the future. However, one of the things that Allan indicates that the course prevents him from doing is to spend time on his social life. This lack of a social life seems to be a big sacrifice, because further on in the interview Allan says that a social network serves an important coping function in his daily life. This is the third well-being mechanism I suggest is critical to Allan's well-being. It may be illustrated in the following quote:

> "...if I've been working all week-end, and then it gets to Sunday night and I have to get up and go to work the next day, I get a bit depressed...then I just need to get out with my mates and have a few beers and put things in perspective, and everything's okay"

The fourth element that may partly explain how Allan retains his level of well-being at a fairly stable level relates to his working life and involves a cognitive strategy. The following statement shows that distancing work to enhance his well-being at work, and possibly beyond, is a way of dealing with stress for him:

> "...I think I've become more detached. So when there were a lot of these recent...organisational changes, I was taking things really personally, things going wrong, and I was kind of taking it all on myself, things I had done or whatever...More recently, I think I had a realisation that...though I am contributing to try and change the organisation and make things better, there's so many things going wrong...I cannot actually control everything, and so I've just had this realisation...I have become more detached from myself. And that way I deal with it better"

This form of coping fits in with Lazarus' (2000) concept of emotion-focused coping, which is distinct from problem-focused coping. His and Folkman's research has shown that, in contrast to situations in which outcomes are controllable, situations in which the individual cannot control the outcome, the use of problem-focused coping may be detrimental to well-being, and emotion-focused coping is preferable.

The fifth way that works to enhance Allan's well-being is the exercise he is doing. He describes himself as doing regular aerobic exercise two to three times a week; running once or twice a week, and usually playing a game of badminton once a week. During the summer he cycles to and from work two to three times a week, but indicates that the bad weather during the winter stops him from using cycling as a means of transportation. Importantly, he says that he does not think he does as much exercise as he would like to do due not only to the weather but also due to time constraints. Allan indicates in the interview that his levels of physical activity have decreased during the past eight months, but his motivation to exercise touches many different levels. He says:

> "...It [exercise] makes me feel better. If I am reasonably fit then I'm better able to cope with problems that hit me, whether they're personal or whether they're at work...I guess the main reason I do it really is to keep fit. It makes me feel better, it makes me feel healthier...It prevents me getting fat..."

According to self-determination theory, Allan's motivation to exercise would be characterised as being identified regulation, because the exercise behaviour is accepted by him as being personally valuable. He has begun to incorporate the behaviour into his sense of self. His intrinsic aspiration to feel good about himself through exercise is accompanied by a high degree of autonomy:

> "I guess I don't come across any barriers, if I start coming across things that I think...I need to be able to do this, I'll just do it. I will get fit"

The sense of autonomy is considered one of the fundamental requisites of self-determined behaviour, and the development of true self-esteem (Deci & Ryan, 1995). Allan also uses exercise as a coping mechanism against stress, and exercise may be identified as an emotion-focused coping strategy.

In terms of Allan's working life, exercise has positive implications for how productive he feels at work. He explains:

> "...if I go out for a run, I just have a sandwich when I go back, and will be a lot more productive in the afternoon"

It is likely then, that the feeling of enhanced productivity that Allan experiences after a lunch-time run is due to the increased personal resources in the form of increased energy. So, it is established that exercise has the ability to improve levels of positive affect as well as feelings of productivity. But what about job satisfaction? Allan makes a very important statement that shows that levels of job satisfaction for him are not directly associated with exercise participation:

> "I don't think it will necessarily make your job...any better, but it will perhaps make the bad things about that job feel less significant. You might be able to deal with them better"

Allan explains that the reason his job satisfaction is not directly related to exercise participation is due to the lack of control he feels at work. The statement shows that exercise does not solve any work-related problems as such, but work for Allan to protect him from the adverse effects of stress. Hence, exercise does not increase Allan's level of job satisfaction directly, but helps him cope with the stressful demands of his job by reducing the significance of the stressor. In other words, exercise may act as a buffer against the potential harmful effects of stress.

For Allan, then, the effects of exercise on mental well-being should be seen in the light of the control of the situation. He explains:

> "...your personal life you have more control over, so there's probably a stronger correlation between exercising and your satisfaction with life. So, some of the things I like to do are going climbing, walking and that's all related to exercise. If I can go on holiday and have all week climbing in the Alps, I feel pretty good about myself, that's all to do with my life, and I'm exercising at the same time...obviously that makes an impact on my self-esteem"

In addition, for him, the reason that exercise positively affects his satisfaction with life and his self-esteem is because exercise is relevant to the motives and needs in his personal life.

In conclusion, the information Allan provided in the questionnaire gave me some indication that he could well be categorised as belonging to the cluster "The self-assured employee". Several processes of change were identified that could explain why his job satisfaction has changed during the eight months. An increased lack of control, especially with the organisational changes that have happened in the company, has decreased the moderate to high amount of job satisfaction he reported in the questionnaire eight months previously. Although he reported that exercise does not change his levels of job satisfaction, the indication a) that it acted as a buffer against stress and b) that he was doing less exercise at the moment may have contributed indirectly to him reporting a relatively low level of job satisfaction. Interestingly, though, Allan's high level of life satisfaction does not seem to have been affected by the stressful circumstances in his life, and indicates the extent to which he adopts successful strategies to maintaining high levels of life satisfaction, and therefore the stability of the construct. These strategies include: effectively balancing working life with life outside work, working towards important goals, maintaining his social life, detaching himself from work's pressures (using emotion-focused coping) and staying physically active by keeping up his exercise routine. Finally, Allan did say that his fitness status had decreased during the past eight months due to less exercising. However, his high level of self-efficacy and outcome expectations illustrated his commitment to increase his exercise levels and it is therefore most likely that his satisfaction with his physical self would return to previous levels, as indicated in his questionnaire responses, when spring arrives.

KATE

Kate is a very positive person, who approached the interview with interest, and taking her time to answer the questions I asked her. I felt she was very open, keen to talk about her life, and laughed a lot during the course of the interview. Her sense of confidence with herself was evident from the time she entered the room, and her positive attitude helped me to relax and carry out the interview, which was very much a dialogue rather than a one-way interaction.

Kate is a thirty-two year-old single woman, who lives with her partner, but does not have any children. She works thirty-nine hours per week in the corporation and has been working there for approximately six years, although she has only been in her current job for two years. She works as a support engineer, and considers communication abilities and on-going technical knowledge to be the main demands of her job. Interestingly, the amount of work she does has a large effect on her mood, as she says:

> "...If I haven't got much to do, I'm really pissed off (laughing). I hate it when I haven't got enough to do...if you're bored, that's an absolute nightmare...I can cope with being too busy"

She continues:

> "...If I don't see that I've been productive in a day, whether it's because I haven't got enough to do, or...whatever other reason, that puts me in a bad mood"

According to Csikszentmihalyi's theory of optimal stimulation, stress may occur when the individual is either over-stimulated, i.e. when demands exceed perceived capabilities, or under-stimulated, i.e. when demands do not meet perceived capabilities. In Kate's case, the under-stimulation she experiences occasionally causes negative affect at work, and may also indicate her high level of perceived job competence. In fact, her questionnaire responses indicated a very high level of perceived job competence.

According to the questionnaire response, Kate's profile on self-esteem and life satisfaction was very high, and, indeed, she described herself in the interview as being

"...quite high on both of them". One of the characteristics of people with a high level of true self-esteem (versus contingent self-esteem) is that, although they feel pleased when they are successful in achieving a goal and disappointed when they are not successful in achieving it, their sense of self-esteem will not fluctuate as a result (Deci & Ryan, 1995). Although work life is very important to Kate's sense of self, her ability to use distancing as a way of maintaining levels of self-esteem may be one indicator of her level of true self-esteem. She explains:

> "I think you do have to not take it too seriously...you can't get too upset about things...try not to get too emotional about it"

This is a type of coping strategy that has been referred to as emotion-focused coping (Lazarus & Folkman, 1984). Lazarus (1991) has stated that emotion-focused coping is the most appropriate form of coping in situations in which the nature of the stressor cannot be solved.

When she was asked about the relationship between her job and life satisfaction, it was interesting to note that she saw the relationship as going in one direction:

> "...I'm not so sure...if my satisfaction with life went down whether it would have an effect on my job...if I'm not happy at home, then it won't make any difference in my job. In fact, it probably helps...But if I'm not happy with my job, it definitely has an effect on my life"

It is clear from this statement, that the activities in her personal life may not have any implications for her well-being at work, whereas her work-related well-being has clear implications for her life satisfaction. The fact that Kate uses work as a distraction from her personal problems is clearly one of the strategies that Kate uses to maintain her levels of well-being.

With regard to the relationship between moods at work and job satisfaction, she indicates that it is her satisfaction with her work that affects the nature of her affect, not the reverse. This finding goes in contrast with the structural equation model designed in Study 1 based on the questionnaire responses, where affect at work is suggested to predict job satisfaction.

In addition, Kate describes another element of the source of her job satisfaction as follows:

> "You got to be challenged. I like it, because I am quite challenged. I know, at times I'm a bit bored, but…when I've got work to do, it is pretty much interesting work…I do like to have…real technical problems, problem solving, which is what I've got, so I'm happy…"

Compared to most other people I interviewed, Kate feels in control of her work situation. She indicates that if she did not feel satisfied with her job, and could not do anything to solve the problem that is the cause of her job dissatisfaction, she would leave the job. She says:

> "If it's something I can do something about, I do something about it. But if it's something in your job that you can't do anything about, beyond your control, leave (laughing). Move to a different job…"

It is interesting to note that, in contrast to Allan who is a member of the same cluster, Kate sees job satisfaction as being very stable, and considers herself very high on levels of job satisfaction. This finding goes in contrast to the cluster description in which she is described as having a moderate level of job satisfaction. The fact that she states that she would leave her job if she could not solve a problematic situation at work sheds some light as to the control she feels over her own life.

Her problem-focused approach goes beyond work-related situations, and is evident in her personal life as well. The following quote illustrates the process by which she determines the action she needs to take in a given problematic situation:

> "…the way I work is…right now I'm not happy, why am I not happy, this reason…it might be the house you're living in, or…whatever reason, and then think: is it long-term or short-term (laughing). I'm analytical about it. I think, yes, if it's something that's still gonna be…getting on my nerves in a year, then that's like, yeah, you gotta do something about it…if it's getting on your nerves…in two weeks' time, then I think, all right, fair enough, don't worry about it. And I stop worrying about it, cause it'll be done in two weeks. If it's something long-term, I think right…I'm gonna do something about that"

Kate's problem-solving approach seems to be one way of maintaining a sense of personal control over her life, which is an important element of well-being (Peterson, 1999).

Apart from her use of problem-focused coping and her feelings of personal control, two additional factors are imperative for maintaining her level of mental well-being:

> "...also having a social life...and I don't mean out every night, I don't go out every night, but...having friends to go and do things with, go and see bands, go to festivals or whatever, that's what I like so much...also having a home where you feel secure and stable, that's very, very important. It's having I think...stability really is the main thing definitely with me, stability of where you live, and who your friends are, and your family...that being constant is the main thing with me"

The importance of a positive social environment transcends into Kate's working life as well, as she describes:

> "It's nice to have nice people to work with...that's always really important for your day-to-day work...But everybody's nice here (laughing). Everybody's so friendly here, that you don't ever feel...got at, or...you don't worry too much about if you've made a mistake...You don't feel as though you're gonna be blamed, which is...really important, so you feel quite secure. And to be honest with you, you don't make mistakes because of that. I think mistakes get made...if you worry about getting blamed..."

The importance of social interaction for her also transcends into her interest for exercising.

> "We [partner and her] go and play badminton and stuff...it gives you something to do, an activity to do together. I think it's, you know, a big thing"

Keeping in mind Kate's social needs, it is possible that exercise may have a more profound effect on her mental well-being to the extent that she socialises while exercising. Certainly, social interaction is one of the main mechanisms suggested in previous literature that may explain the effect of exercise on mental well-being (Fox, 1999). Kate's experience is an example of how individual needs should be taken into account when designing exercise programmes at work, and promoting exercise in a corporate population.

However, in addition to the social context of the exercise, Kate also describes the way in which physical activity works to distract her from any problems she may have had a work, and that may interfere with her life outside work. She explains:

> "...I spent an hour cycling home, because it's a long way, and I'm here, and you've forgotten all about a hard day's work"

Therefore, there is also some support for a distraction hypothesis and physical activity may work towards balancing work with home life by minimising the effect of potential negative stressors at work on her adjustment to home life.

Relating exercise specifically with work-related well-being, Kate states how its consequences in terms of improved positive affect may have an indirect effect upon feelings of job competence or productivity:

> "And you do have more energy, don't you? And so, if you've got more energy, you're gonna be better at your job as well...you're definitely more on the ball when you do exercise"

This statement provides some support for suggestions that exercise has an indirect effect on organisational outcomes through positive affect at work, as suggested in the well-being model in Study 1.

It is interesting to note, that although Kate considers herself "a bit overweight", and would like to lose some weight, she reported a high level of physical satisfaction in the questionnaire response. It becomes clear, however, that this may be due to the fact that she does not consider the physical aspects of herself very important:

> "I feel I'm a bit overweight. Although it doesn't terribly, you know, affect me dreadfully. It does make a bit of a difference, cause you always got this nagging little thing, oh God, I really should do it, yeah, feelings of guilt...I'm quite satisfied with my health otherwise"

The reason that Kate does not engage in more exercise or change her alcohol patterns (she shares a bottle of wine with her partner each evening), seems to be that it is not important enough for her to lose weight. Here, her problem-solving approach to her life comes in, too:

> "...I put on quite a lot of weight once, and then it started to actually bother me. When it starts to actually bother me, I'll do something about it..."

It is quite possible that Kate's high level of self-esteem also implicates a certain amount of physical acceptance of herself. This characteristic is also typical of people high in true self-esteem; they are not controlled by social dictates (Deci & Ryan, 1995).

In conclusion, it seems that Kate is correctly classified as a person with high levels of global well-being. In addition, she can be characterised as having high levels of true self-esteem, a finding that was not possible to uncover through the cluster analysis. The stability in her levels of self-esteem and life satisfaction is better understood when examining the strategies she uses to maintain her high levels of global well-being. These include: lack of spill-over from life to work, control of working life and life as a whole, adopting the appropriate coping strategies according to the nature of the situation, having a good social network at work and outside work, having a stable home, and doing physical activity (as a means of transport or in a social context). It is important to note here that although the cluster description does describe Kate well in terms of global well-being and physical well-being, some variation within the clusters does exist. For example, Kate's job satisfaction seemed to be higher than indicated by the description of the cluster. In cases of under-stimulation, she was prone to feel increased negative affect at work, which may explain why her levels of affect at work could be described as moderate. However, physical activity as a means of transportation seemed to be one way in which these negative feelings occurring at work could help her to decrease the spill-over effects from work to her life outside work.

LUCY

Lucy is a friendly 33-year old married woman with no children. At first, she seemed a bit timid, did not talk a lot, and did not radiate happiness. Later on in the interview, however, she became more talkative and opened up more. I feel we established a good rapport during the course of the interview, and the interview was quite personable. It seemed that, as she grew to trust me, she started to talk more about her life.

Specifically, Lucy works as a software engineer, and has worked as such for approximately twelve years. She has been with the current company for two and a half years. She considers flexibility the main demand of the job, both in terms of working

hours, working style, technical knowledge, and application, but she generally feels that she can confidently master these demands. However, the amount of stress she experiences depends on the particular project she is working on. She explains that at the time of replying to the questionnaire, her work life was very stressful, which also influenced her state of health and well-being outside work. She explains about that time:

> "...it was incredibly stressful...the project I was on was late and it was very intense for nine months...I was thinking about it, yeah, waking up in the middle of the night...and just permanently thinking about it. Long hours...just feeling very pressurised and overwhelmed for a long time...the relationship wasn't going very well, and that was influenced by stress"

It is clear from the above statement that, for her, work-life and life outside work cannot be segregated, which supports suggestions that when examining the well-being of a corporate population using a holistic approach, several areas of life and their interrelationships should be considered (Hart, 1999). The strength of the relationship between life and job satisfaction for Lucy is illustrated in the following quote:

> "It's strongly related. If I was only satisfied with my job, and not satisfied with the rest of my life, I wouldn't be satisfied with life. But similarly, if I was satisfied with the rest of my life, and completely unsatisfied with my job, I still wouldn't be satisfied"

The stressful period that Lucy referred to manifested itself in low levels of life satisfaction, and the fact that the stressfulness of the job has decreased since is one of the contributors to her life satisfaction increasing to moderate levels. It is surprising to note the low levels of life satisfaction she reported when talking about the time when she filled in the questionnaire, as her cluster membership, as indeed her individual questionnaire response, is described as being high on this construct. Hence, in Lucy's case, the description of life satisfaction does not fit very well. That may be due to the time lapse between questionnaire administration and the interview, or to social desirability at the time of questionnaire administration. The discrepancy may also be due to her level of happiness, as unhappy people recall events more negatively than happy individuals as indicated by Seidlitz and Diener (1993). Lucy does indicate that, although her life satisfaction has increased since the stressful period, it is still only fifty percent of

maximum life satisfaction. She describes the factors that helps her or would help her to increase her levels of life satisfaction:

> "...more challenging work...and a more defined feature cause what I'm doing at the moment is very up in the air cause I'm meant to be moving to a new project, but I can't go till they replace me, and I don't know when that'll be and because I don't know when, I'm not being given any interesting work cause I might leave...it's a bit of a vicious circle, so I'm a bit bored really with what I'm doing...so that's one factor...the other factor is self...the work-life balance side, and I'm managing to do the things I want to do out of work more now because I've got the balance...but the other factor that's not good now and it wasn't good then is personal relationship. So that's the other big factor"

Lucy's unresolved job situation seems to be a big factor that affects her level of well-being. Her current job situation is akin to what occupational researchers refer to as a type of role ambiguity, where the individual does not know exactly how she fits into the company, which is a source of stress that is intrinsic to the job (Arnold, Cooper, & Robertson, 1998). This source of stress manifests itself partly in terms of low levels of job satisfaction. It is interesting to note how different forms of stressors manifest themselves differently for Lucy. The stress she experienced eight months previously due to work overload manifested itself cognitively and physically whereby she woke up in the night, whereas the stress she currently suffers, which is due to work underload and role ambiguity manifests itself attitudinally in the form of lowered levels of job satisfaction. In addition, due to the nature of the situation at work, Lucy feels that she cannot be as productive as she would like to be, which also negatively influences her level of job satisfaction as well as her moods at work:

> "...feelings of work productivity and effectiveness at work influences my job satisfaction. Because if I feel I'm not being very productive, then it makes me dissatisfied. Because I don't feel like I'm pulling my weight, I don't like that...and it does make me feel down. Coz also if I'm feeling bored at work, I'm not doing enough, I feel moody...if the job is not going well, it does influence my moods at work, if I'm frustrated or sort of unstimulated"

Interestingly, although Lucy explained that she was very dissatisfied with her life eight months previously, her levels of self-esteem, she explains, were high. The reason, she says, is that she was doing the job well, even if very stressful, and had well functioning friendships. In contrast, however, her self-esteem is lower currently, which she attributes to her work, which she states is not "worthwhile". Therefore, it is clear

that Lucy is quite dependent on her work for feeling good about herself. Accordingly, it seems that her self-esteem is rather contingent on her successes, and it is revealed, when she describes the contributors to her self-esteem, which include interpersonal relationships:

> "...how I'm getting on with other people. How I perceive other people view me...and when I say how people think of me, there's two sides to that. It's personally and professionally. Yeah, and how happy I am with that. I don't want to be well thought of because, for doing things I don't wanna do. It has to be for the things that I think are worthwhile"

The description of the nature of her self-esteem does fit in well with the notion of contingent self-esteem, which is partly characterised by living up to interpersonal expectations (Deci & Ryan, 1995). It is therefore probably more likely, as was illustrated earlier, that her levels of self-esteem will fluctuate more compared to a person who has an integrated sense of self, such as Kate. The analysis of these two interviews show that in order to understand the complex structure of self-esteem it is necessary to go beyond the analysis examining low versus high self-esteem (Deci & Ryan, 1995). It is interesting that, although these two women describe themselves similarly on a questionnaire (i.e. belong to the same cluster group), their adaptive functioning in life is very different in some respects. In line with thoughts about the self based on symbolic interactionism the self here emerges not just from Lucy herself, but also from how others see her and how she responds to others.

The role of exercise in Lucy's life is significant. She found that during her stressful period at work, it helped her cope with her stress levels. She also explained that different modes of exercise helped her in different ways:

> "...actually I found when I was feeling very stressed out at work it [exercise] helped ...Well, there was swimming and climbing. The swimming relaxed me, the climbing took my mind off it, because it was too self-absorbing...I used to go out swimming at lunchtime when I was getting too stressed and it used to help"

There are several elements to this statement. First of all, it seems that, for Lucy, exercise works effectively for her to improve her affective well-being. Secondly, different types of exercise work in different ways to improve her well-being. Through the regulation of mood levels, swimming seems to work as a buffering mechanism

against stress, whereas climbing seems to work through its capacity as a distraction mechanism. Hence, in addition to considering individual differences when examining the mechanisms linking exercise with mental well-being, types or modes of exercise should also be taken into account.

The notion of regularity of exercise is also important to understanding the effect of exercise on Lucy's mental well-being, as she explains:

> "...I really felt the need to do it absolutely regularly when I was really stressed out, whereas now I do it sort if for pleasure, then I really, it was like I *have* to do this 'coz it would make me feel better. It will take my mind off it"

The interview with Lucy revealed that the exercise seemed to be one of the only effective behavioural strategies with which Lucy coped with her stress. Her motivation to exercise at that time could be characterised as extrinsic and more specifically as identified regulation, a form of self-determined behaviour, which, however, is not fully integrated within the self (Vallerand, 1997). However, she was still able to adhere to a regular exercise programme due to her belief and expectations that exercise did indeed make a difference to her well-being. The positive affective experiences she encountered as a result of exercising, further enhanced her adherence to exercise during the stressful period, which reportedly lasted for nine months.

Interestingly, when the stressful working situation had decreased in intensity, Lucy's exercise regimen also decreased, even though, as is reported above, her motivation became more self-determined and hence intrinsic (exercising because of the enjoyment of it). This decrease in physical activity has had implications for her physical satisfaction and physical self-worth, which have since decreased. Hence the cluster description of a high level of physical satisfaction matched her account of her experience at the time of the questionnaire, and her account also demonstrates the extent to which physical well-being is likely to change over time as a result of changing exercise patterns, as theorised, for example, in Sonstroem and Morgan's Exercise and Self-Esteem Model (1989).

In conclusion, Lucy's account of her low levels of satisfaction at both time points, did not match well with the cluster description of high levels of global well-being. In addition, her self-esteem has decreased within the past six months, which seems to be due to her work situation. The important contributors to her self-esteem may therefore be

characterised as being contingent on living up to interpersonal standards, and I may therefore tentatively conclude that her adaptive functioning is not as effective as other individuals in this cluster. In fact, it is clear that the perceived levels of control that Lucy feels are quite low, and she does not seem to use as many effective strategies for maintaining or enhancing her levels of mental well-being. One exception is engaging in physical exercise. This behaviour has worked for her as both a distraction mechanism and a regulator of mood levels. Her levels of exercise have also worked to enhance her worth and satisfaction with her physical self, which was indeed high, notably during the time of replying to the questionnaire. The lower amounts of exercise she has done since, then, seems to be the reasons that satisfaction with her physical self has dropped a few points since that time. I would tentatively conclude, based on Lucy's own accounts, that exercise is an important tool to maintain or enhance her levels of mental well-being because of the fact that it seems to be one of the only effective strategies she uses which are in her own control.

ANTHONY

Anthony has done a lot of research in his job, and was therefore very appreciative of the research I was doing. Consequently, he was keen to talk about his life and his experiences, and was very pleasant to talk to. Accordingly, the interview was slightly longer than most of the other interviews (approximately forty minutes). Specifically, Anthony is a 35-year old manager of the company. He is married, and has two young children (below age 6). He has been in his current job for approximately one year, and describes the demands of his job as follows:

> "…I have quite a varied job at the moment, and it's partly sort of research, which is…the sort of…thinking bit. But also I have some sort of team leadership stuff in there, and…that I'm sort of new to, and finding that quite…hard to do…I tend to get on with people, and I find I can talk to them quite well, but…I guess my sort of management style is "you come to me with ideas and I'll tell you whether I think they're good ones or not". But the group I'm working with at the moment aren't generating as many good ideas as I'd like…Because I think that's a situation where I have to try and come up with all the ideas, which is harder work…you don't get to sort of managing them doing the task, you have to sort of think also about what the task is they should be doing…that's a bit harder, while at the same time trying to do some of your own sort of thinking about what <u>you</u> should be doing in the spare time that you may not have anymore"

This extra amount of work and responsibility makes him feel frustrated with the current situation he is in, and is a contributor to work overload, or more specifically quantitative work stress, a concept derived from the observation that managers have too much to do, given the resources they have available, e.g. time (Furnham, 1997). This leads to feelings of lack of control. He also talks about an additional factor that contributes to feelings of lack of control:

> "...I'm not very good at saying no if someone comes up and says "oh can you help with this". And I have sort of a helpful nature so I tend to say yes, and then you've said yes and it's hard to back out at that stage..."

As a consequence, although Anthony works thirty-nine hours per week on site, he often includes a few hours of work at home during the evening after his children have gone to bed. Although his wife is appreciative of the fact that Anthony makes an effort to spend time with his children when he returns from work, this extra amount of work does interfere with the amount of time he can spend with his wife on his own. The fact that he is loyal to both his family responsibilities as well as his job has the potential to induce stress resulting from home-work interface. However, one of the ways in which he is able to keep this stress under control is through the use of time management, as he explains:

> "...I have a reminder in my calendar...to tell me at four o'clock it says I'm going home, because I've got a couple of kids and they're sort of in bed round about seven and if you don't get home...you don't see them..."

This strategy seems to be one that maintains Anthony's level of well-being, because it enhances his sense of control over his life. Using time management as a means of controlling stress resulting from work overload is something that he also tries to do at work, however, he finds it difficult:

> "...I find the constant sort of switching context between different tasks is actually, slows me down...that's just come in the sort of couple of weeks, of thinking that....rather than saying I'm gonna focus on this task for a couple of hours maybe thinking I'm gonna focus on this task ostensibly for the week. Baring in mind there will obviously be interruptions, the focus is still on that thing...Earlier on in my career I felt as if I was able to focus on sort of one or

> two tasks, whereas now I've got a dozen...what gets harder is doing the prioritisation...you're balancing some plates, but...if you spend all your time balancing all the plates, you know, eventually...they all seem to drop off"

Nevertheless, Anthony is quite successful at balancing his work life with his life outside work, because he has taken a conscious decision to prioritise the most important things in his life:

> "I hear so much talk about...people getting sacked and the rat race and so on. I do actually try and fight against it...I think there are some people who come in later and finish later, you know they see you leaving earlier. I think that does get noticed but...I've got over worrying about that...I do fight against...all the stuff that you can sort of let get on top of you...so in a sense the battle I fight is about being as productive as I can with the time available, whereas some people stretch the time they're available to do the work. I say "no, this is the amount of time I'm gonna, you know dedicate to work, because I'm aware of things like work-life balance..."

However, he does note that any negative affective states he may experience due to a problem in his working life occasionally spill over into how he behaves outside work:

> "...if I've had a bad day at work, when I go home I can be a bit snappy...my kids say "oh, stressy daddy"...then you sort of realise that that's the case and you sort of calm down a bit..."

I therefore suggest that the balance in his life he gets through interaction with his family actually often works to maintain his high levels of well-being. In addition, the high prioritisation of working towards a healthy work-life balance works in a positive way to strengthen his relationship with his wife and the social support she gives him:

> "...my wife isn't saying "oh, you're never around"...so she appreciates the fact that...I try to get home earlier to sort of be involved with the children..."

In addition, although he rated the importance of work to his sense of self as relatively high, he explains that he works to live rather than live to work. So the prioritisation he makes is an important factor in keeping his levels of life satisfaction intact, which indeed are high. He explains that this level of life satisfaction has changed somewhat over the past eight months due to less travelling with work, which prevented him from executing this balance between work and home. However, it is clear that the

nature of his life satisfaction is relatively stable when he explains the process by which he judges his level of life satisfaction:

> "...I think satisfaction with life is...based around an ability to...appreciate what I've got...some of those comic relief the other week, and I mean you only gotta watch that, you think what have I got to worry about, you know...some people only think like that when it's there in front of their faces...my satisfaction with life...is based on a general feeling of how large a percentage of the world doesn't have anything like what I have...so I generally go around with a smile on my face, because...you can't but feel how...fortunate I am...I could have been born...in hundred and fifty other countries in the world...and be worse off, so I tend to think I don't have much to...complain about"

His statement illustrates that the way in which life satisfaction is maintained in problematic periods of life is through comparison with other people's lives. This directly supports Michalos' (1985) multiple discrepancy theory of satisfaction, which predicts that a downward comparison (i.e. where the comparison is lower) results in enhanced levels of life satisfaction. Therefore, I can conclude from this statement that the cluster description of high levels of life satisfaction seems to be correct.

With regard to levels of self-esteem, it is very interesting to note that Anthony differentiates his self-esteem outside work with the sense of worth he feels at work. This issue once again demonstrates the importance of conducting interviews as a way of validating cluster membership to understand better the distinction between different group members. First of all, Anthony indicates that his level of self-esteem outside work is relatively high, and has not changed since he replied to the questionnaire. However, his self-esteem at work is lower, and is determined largely by his feelings of accomplishment at work. Speaking of the contributors to his self-esteem at work, he says:

> "...how valuable you feel what you're doing is to the...company as a whole. And that's driven by I think one's ability to sort of achieve things, and I think it's different if you're a manager than if you're just a sort of staff member. If you're a staff member the achievements are driven by sort of doing things. If you're a manager...it's about getting other people to do things. And I guess that's when some of the sort of frustration comes in...as related to the self-esteem [at work]...I have more doubts in that area as to sort of how much I'm contributing to the...company based on the amount they pay me...If I sometimes feel my self-esteem is lower...it's because...I feel I'm not producing enough of the concrete stuff [due to being a manager of others]"

However, although he may feel uncertain of his own performance at work, his performance ratings have been good. The separation between self-esteem at work and self-esteem outside work seems to be an effective strategy, albeit unconscious, of retaining high levels of global well-being. A consideration of identity theory (Burke, 1991) may shed some light as to understanding why this may be the case. According to identity theory, individual differences in the salience ascribed to a particular role identity should be taken into account, because the strength of the relationship between role-related stressors and mental well-being is moderated by the salience of that role identity. Although Anthony sees his job as important and wants to perform well at his job, his work role identity is not the most salient in his life. Consequently, although the stressors he experiences related to his work-role identity affect his self-esteem at work, they do not ultimately negatively impact on his overall sense of self-worth.

It is interesting to note the reason Anthony gives for the relatively high levels of job satisfaction he reports:

> "…I am very happy with the job I have now…it's not the best job I would choose but then I…look at all the benefits that accrue from that outside of work…"

Again, his account demonstrates the extent to which what he does outside work is more important to his levels of well-being than the intrinsic aspects of his job.

Another very important contributor to Anthony's level of well-being is exercise participation, which is a regular feature during the week. All of the exercise he does take place in a social context, i.e. they are either team games or doubles games. He plays sport twice a week, and his exercise motivation could be characterised as being intrinsically regulated:

> "…the exercise I do…is mostly around sort of ball games, football, tennis, badminton…that sort of thing…that's 'cause I just do enjoy ball games. I've never been very good at going to the gym or something…so in some sense the exercise is a by-product of my enjoyment of running about chasing a ball"

According to self-determination theory, the fact that his motivation for exercising is largely intrinsic and characterised as enjoyable should have a more positive impact on his levels of well-being compared to behaviours which are more extrinsically regulated,

due to fulfilling the human needs of autonomy, competence, and relatedness (Deci & Ryan, 1985).

To a large extent, it seems that it is the outcomes of exercise, including physical self-worth and satisfaction, which explains the link between exercise participation and work-related well-being. Specifically, he states:

> "...if any of those [physical self-worth or physical satisfaction] I did feel less good about, it would impact on the other things [life satisfaction and self-esteem]. So, to my mind there's a definite relationship between them and how I deal with things at work..."

In addition, he explains that at the time of replying to the questionnaire, the high amount of travelling he was doing meant that his regular weekly exercise sessions were broken, which did have a negative impact on his feelings of fitness and appearance, in terms of gaining weight.

In conclusion, the interview provided some important insight into mechanisms not identified by his questionnaire responses. Anthony discriminates between his overall sense of self-worth, and his feelings of self-worth or job competence at work. This distinction seems to protect his feelings about himself as a person, as the lower perceptions of himself as a competent employee does not interfere with his overall feelings about himself as a person. Although he values his job, and is indeed a competent employee according to his performance ratings, the fact that he values and prioritises his family life above his job probably contributes to him being able to distinguish his sense of self at work from that outside of work.

Overall description of cluster 2: "The worried and unhappy employee"

According to the cluster solution, individuals in this cluster may be described as being dissatisfied with their lives. According to Pavot and Diener (1993), this group may be categorised as being "slightly dissatisfied" with life ($M = 17.74$). In addition, they have low levels of self-worth. These employees have low levels of job satisfaction, low levels of perceptions of job competence, and low levels of enthusiasm and relaxation at work. In contrast, they had high levels of nervousness and fatigue at work. In other words, members of this cluster seem to be coping poorly in life and at work.

LISA

Lisa is a 37 year-old married woman with no children. She works in the organisation as an analyst, having been with the company for four years but working on different projects. I had some unexpected problems with the audio-tape recorder prior to this interview, which meant that I had to postpone our appointment for an hour, but she was very understanding. The initial impression I got from her was that she was friendly, but not a happy person. Despite my efforts to explain the aims of the interview prior to conducting it, she seemed to be sceptical as to the usefulness of the interview. However, she was very open about her problems, which helped me greatly to understand the reasons for her low levels of well-being.

More specifically, it was clear from the outset of the interview that one of the main problems faced by Lisa was her lack of enjoyment with her job, perhaps due to perceived lack of job competence, as she explained:

> "...I think, I'm personally finding it difficult when I'm not fully confident in the area that I'm in...so...I don't feel that my background, technical knowledge...or business knowledge is as good as I would hope it was. Yeah, so that puts added pressure on me, I think, because I'm not feeling that I'm particularly up to the job"

In addition, it is interesting to note, that whereas Lisa indicates in the questionnaire eight months previously, that being good at work was very important to her, the perceived level of competence she felt at work was less than optimal. The lack of job competence she feels seems to be the main source of stress she feels at work, which also has wider implications for her general well-being, especially self-esteem:

> "I need to feel that I'm doing a good job, and at the moment I don't feel that I am...if I don't think I'm being effective at work, then yes, I don't feel good about myself"

This quote indicates the high reliance on the job for feeling good about herself. It seems that her feelings of competence at work are influenced by her perception of what other people think about her:

> "...I'm also thinking about other people's perceptions of how I do my job. It's not so much whether other people like me, although I guess that would be nice

> if they did…I am certainly concerned with how other people see me as doing my job, how professional I am"

In contrast to individuals with high levels of self-esteem, she does not use self-enhancement strategies, which in her case could be done by attaching less importance on being good at her work. People low in self-esteem have been characterised as using fewer self-enhancing strategies, as they by definition are accustomed to thinking about themselves in a negative fashion in order to retain self-integrity (Brown, 1993).

Therefore, in contrast to the employees described as having high levels of global well-being and high physical satisfaction, it is clear that Lisa does not use effective coping strategies to enhance her well-being. As a consequence, her problems carry over into her life outside of work, too:

> "…my job is a huge part of my life, so, you know, a lot of hours at work…and I do tend to worry about work outside of work as well…There are some people I know who can walk out the door, but I don't find that easy to do, and just forget things, the sort of tune-over, so I end up having trouble sleeping as well"

The effect that worries about her job have on somatic complaints is another critical element in the understanding of Lisa's low level of well-being, because being satisfied with her state of health is very important to her life satisfaction, as indicated in the questionnaire. Therefore, the discrepancy between high importance of health and a low level of satisfaction with it creates a negative influence on her global well-being. The low physical satisfaction she feels is indicated in the questionnaire responses as well as in the interview:

> "…I suffer a lot from, an awful lot of colds and headaches and things, and I think a lot of it is based on work, the terrapins that I work in…the air conditioning in there's really bad, and a lot of people are affected by it…and my job I guess worries about the job, ehm, means that I don't sleep as well at night. I haven't slept well for quite a few years really, but I've been particularly bad on occasions and I put that down to either because I've been, you know, not feeling very well or because of my job's been particularly bad and I'm worrying about it at the time"

In addition, although she indicates in the questionnaire and in the interview that satisfaction with her appearance is not of major concern to her, she sees health and appearance as being interrelated:

> "...appearance I guess I've never been that bothered really, but I have got really huge circles under my eyes sometimes, and today's one of those days, and that worries me, cause I link that then with health to be honest"

Although other interviewees have indicated the imperative role of exercise in enhancing physical satisfaction and, in some cases, global well-being, Lisa does not have an inherent belief in the positive influence of exercise on health and well-being. However, she states:

> "...I don't know if it's because I'm permanently in an environment where it's not a good working environment...it seems to be disease control frankly...so it doesn't seem to affect me to that extent. I don't know, it could just be me"

Understanding why some individuals benefit from exercising and others do not may be partly due to the extent to which the behaviour has been internalised into people's sense of self. In Lisa's case, the exercise behaviour is clearly at the lower end of the extrinsic motivation continuum, or more specifically, introjected regulation (Deci & Ryan, 1985). She describes her experience with exercising as follows:

> "When I play squash, I always loose. So frankly, it doesn't necessarily make me feel any better. I don't particularly enjoy sport though, but I know that I ought to...and I don't do as much physical activity as I probably should, so when I do have a chance to, then yes I will tend to. Although, sometimes...if my job's not going very well, then I don't seem to have a chance to do that either..."

Lisa experiences a sense of lack of control. Not only does she seem to have a general lack of efficacy beliefs with regard to various aspects of her life (at work or when playing sports), but it also appears that she believes she has no control over the events that happen in her life. She believes that negative aspects of her life are enduring and stable whereas positive ones are transitory and unstable. For example, the way in which she speaks about changes, or lack thereof, in her satisfaction with the physical aspects of herself clarifies this point:

> "I'm really really really fed up with always having colds or sinus problems or allergies or whatever it is. And headaches, I'm completely fed up with that…I haven't slept well for quite a while, and I'm getting really fed up with that as well…I've tried all sorts of things. I have not slept well for ten years probably. And sometimes it's worse than others. I get quite a lot of disturbed sleep, I'm imagining all kinds of things…"

In addition, I asked Lisa to describe periods in her life when she felt really good about her life and asked her to rank it on a ten-item scale. Her reply also illustrates the above point:

> "…for example, I've organised a couple of sort of parties and things for significant milestones in people's lives, and there I sort of did catering and stuff for those as well, and did all the organisation anyway, and that went really well, so those were good. That was good. I enjoyed that. And part of it was stressful obviously leading up to it, but, you know…I mean there have been other similar things, but there has certainly been sort of say between eight and ten, but for a very short period of time, and I can't see that it would have been more than a week at a time. So, perhaps when I was on holiday or something for example…probably always away from work frankly"

The above two quotes illustrate Lisa's view of herself in the world, and fits in well with hopelessness theory as described by Peterson (1999). Specifically, hopelessness theory (Abramson, Metalsky, & Alloy, 1989) suggests that the belief in a hopeless future is enhanced by stable and global explanations for bad life events and by a high degree of importance attached to those events (Peterson, 1999).

The negative feelings about her work which highly influence other aspects of life, including general life satisfaction and self-esteem, physical well-being, and well-being in her relationship ("…my partner thinks I've lost my sense of humour") is so problematic for her that she is taking a leave of absence in the near future. The whole past year has been very stressful at work, but she feels that she is making a positive step by this act. This is a way of taking charge of her life, and may stimulate some degree of control over her life. Talking about her feelings about work right now compared to eight months previously, she explains:

> "It's different, because I feel like I've moved on. And I've made certain decisions regarding work and what I'm going to do that I guess are an extension of what I was feeling a year ago…I've decided that I'm taking a

> leave of absence, so I'm putting the whole thing off to one side for a while, just so that I can think about things, that's definitely a big positive step..."

This act could be described as avoidance coping according to Endler and Parker (1990), as avoidance coping strategies involve disengaging either physically or mentally from a stressful situation. However, it is suggested that, whereas strategies to avoid the situation are effective in the short-term, they may not be effective in the longer-term, as the problem may not disappear but rather reappear at a later stage (Hardy, Jones, & Gould, 1996).

In conclusion, Lisa may correctly be classified as an employee with overall low levels of mental well-being, which seem to emanate from her feelings of inadequacy at the job. Although she clearly indicates that she has very low levels of job satisfaction at the moment, her interview suggests that it was even lower eight months previously. With regard to her self-esteem and perceptions of job competence, it appears that these have not changed within the past eight months. Her self-esteem seems to be dependent on living up to interpersonal standards in her job. It was suggested that hopelessness theory (Abramson et al., 1989) may partly explain Lisa's lived experience, in which her explanatory style consists of a habitual tendency to offer stable and global explanations for the stressful events in her life. The theory may shed some light on the vicious cycle that seems to reinforce Lisa's stress. In addition, it is suggested that Lisa does not have many effective coping strategies to cope with her stress, which may be linked to the observation that she sees positive events and happiness as unstable and uncontrollable. The discrepancy between the high importance of health and the low satisfaction with health is also a significant contributor to her levels of life satisfaction. Unfortunately, exercise does not seem to have a positive effect on Lisa's physical or global well-being, and she does not seem to have other strategies to alleviate her lack of satisfaction with her health. She has now decided to take a leave of absence from work, and one hopes that it will help her to gain some degree of control over her life, although in the long-term this leave may not be the most effective strategy for enhancing her levels of well-being.

SIMON

My first impression of Simon was a little bit confusing, as he was just over two hours late for our appointment. I agreed with him that we should nonetheless carry out the interview there and then. It was clear from the outset that he was not a happy man, and he seemed stressed judging by his behavioural manifestations. I did not feel particularly comfortable with the whole situation, but I still feel that I ended up getting a good insight into how his life at work impacted upon the rest of his life. Specifically, he is a married 54-year old engineer with one adult child. He works forty-five hours per week and has changed jobs within the organisation since the time he replied to the questionnaire. It is interesting to note, however, that although he has changed jobs within the organisation, it quickly becomes clear that he is still very unhappy at work. When I asked him about the stressful aspects of his work, he said: "there aren't any in this job at the moment", however, he went on to describe the stressful circumstances surrounding the job at the time of this interview:

> "...at the moment I'm going through a very stressful period, because we have this...we have a ranking system here, and so I've been dumped into the bottom five percent...So I went from...three, which is considered good to very good, down to one, because our chief executive decided that she wanted five percent of people in the bottom band...and they just juggled about to make up the numbers. I'm not a happy bunny at the moment"

As can be seen from Simon's statement, the negative performance feed-back has large consequences for his life, because as he has indicated in the questionnaire, feeling competent at work is very important to his sense of self. The fact that the ranking takes place every six months seems to make the pressure build up inside him as he explains:

> "...now it's been pushed out another six months, so you're looking at uncertainty. For yet another six months, you haven't got a clue what's going on"

The uncertainty and lack of control that Simon feels may have a negative impact on his work productivity:

> "...I think the...ranking thing affects your productivity, because at times you just, you wonder why you're doing some of this stuff, because you don't know whether you're going to be thrown out in six months, you don't know whether your ranking is gonna go up..."

Due to the extended period of time in which Simon feels uncertain about his job future, the negative implications on his work productivity is likely to have an effect on the effectiveness of the unit he works in, and ultimately, on the organisation as a whole. One of the reasons why productivity may decrease following a low performance ranking could be due to increased feelings of failure. Indeed, research has shown that people perform better after success than after failure, and this may especially be the case for people with low self-esteem (Furnham, 1997). Certainly his questionnaire response indicated a low level of self-esteem, and all he could say about how he felt about himself at the moment as a function of the performance appraisal was "oh, well that's bad. That's low".

Simon does believe that complete life satisfaction is possible, and that he has experienced it at a time when, younger, he had a "fantastic" job, and he got married and his child was born. It was interesting to hear Simon talk about his life satisfaction. Obviously, taking into consideration the stresses of the recent performance evaluation and the importance of work to his sense of self, one would expect it to be low. Indeed, he indicated in the questionnaire that he certainly did not think his life was ideal. However, in relative terms, he does not describe it as low in the interview. Out of a scale of ten, he ranks it as eight at the moment, to which he explains:

> "It's hard to say, really. I mean, you have to look at it in relative terms...this ranking thing has really knocked me back. But if I look at my life generally...I can't do anything about the government, so I'll stick myself at eight"

The process that is operating here seems to represent what Cummins (in press) refers to as the homeostatic regulation of life satisfaction. The concept of positive cognitive bias has been suggested to control the homeostatic mechanism of life satisfaction (Cummins & Nistico, 2002), and may be one of the reasons why Simon's describes his overall level of life satisfaction as relatively high. It may serve as a protection mechanism against spiralling further downwards in mental well-being, as positive cognitive bias

work to protect the self from challenges that are likely to cause dissatisfaction (Cummins & Nistico, 2002). When comparing the questionnaire response with the interview response regarding life satisfaction it seems that the information does not match up very well. Given the deterioration in his job situation, the changes that have happened since the questionnaire survey seem to have been largely negative.

It seems that Simon feels ambivalent towards his job, which was also indicated in the questionnaire response. For example, he indicated a low level of satisfaction with his work and that he often felt that the working day would never end, but at the same time he reported that he was relatively enthusiastic about his job. Although he has since got a new job, the ambivalence still seems to prevail:

> "...so, you know, you're pretty happy with yourself, but still find at times being short-tempered and you're not really sure why...and it's very difficult coz, I mean a bit of the job I'm doing at the moment is great fun, and I'm working with some good people in the States, so from that point of view it's excellent. But because of this ranking thing, it puts a big damper on it and it plays on your mind as well, and I think that is having subtle effects..."

Judging by Simon's statement, it seems that it is mostly factors extrinsic to the job that makes him unhappy whereas the actual job itself is rewarding for him. At the moment, however, the intrinsic enjoyment in the work is overshadowed by the negative performance appraisal.

Although Simon does not point out any direct relationship between his current unhappy situation and health, it is clear, when he refers to subtle effects that he means in terms of health. He states:

> "...my backache at the moment, is that a physical thing or is it because of work problems?..."

Research has clearly shown that components of job satisfaction are associated with health, as higher levels of job satisfaction make people happier, which in turn improve health (Argyle, 1997). Simon's questionnaire responses indicated a negative discrepancy between the salience (high) and the satisfaction with health (low) that he felt, and this discrepancy does not seem to have changed during the past eight months,

as he describes his current satisfaction with health as "terrible". He explains how his perceived health status affects his life satisfaction:

> "I'm not a healthy person. I get lots of minor problems, mainly aches and pains, probably muscular, and this backache thing. So when you got backache you feel about twenty years older than you are. When you haven't got it you feel great…It stops you doing so many things as well…like yesterday, I mean I've had this backache since Friday okay, and yesterday had to repair my bicycle, that's what I use to come forth and back to work…and that really …upset my back, so you're very aware of the limitations, things you can do and what you can't do"

It seems therefore, that health is about everyday functionality and mobility. Although at the moment Simon describes his physical well-being as somewhat low due to the backache, he can put it in perspective as he has been much worse off with his back in the past. He recalls:

> "So one time, I mean, I did have a severe problem with my back, and I'd thought I'd be in a wheelchair for the rest of my life, and that was pretty frightening…It's about three years ago…So, I slipped a disc…and that damaged the nerves or something…in the leg…it was so bad I could hardly walk more than a few feet without severe pain…"

One way he agrees that helps him to become more healthy and functional is through exercise. As a result, in the questionnaire, he rated the importance of fitness very highly. However, despite the fact that he leads a relatively active life with active commuting to work (bicycling), he is not completely satisfied with his level of fitness. He does enjoy cycling compared to other forms of exercises, partly because his backache allows him to cycle ("it's not so bad on the cycle. It's easier than try to walk"), and partly because it makes him feel good about himself. He even rides extra miles because he finds it "fun":

> "…I cycle a little bit extra in the mornings anyway, just for the fun of it really…My wife cycles to work now as well, so I follow her to work, and then come back here, so that makes about seven miles in the morning which is quite nice…as you can probably see when I talk about cycling I smile…I never liked exercise…I suppose I started cycling when I was twelve or something…and really didn't like exercise that much, and it's only when I started cycling, and when the cycling got easier, that's when you start to enjoy it. It's not so much a chore. It made a big difference…the big advantage about cycling in and

> out from work is that you're getting the exercise, you don't have to go and waste your time at the gym, which is pretty boring usually"

Simon has clearly found the right way for him to exercise: an enjoyable experience that increases his feelings of well-being even though he does not consider himself a very physical person ("I do not think I've been put together that well skeletally you know"). In fact, his attitude towards "exercise" as a concept is generally negative even if he acknowledges the benefits of it in terms of health. At the same time, he reports that he misses the feelings it gives him in situations in which he does not do any physical activity:

> "...I miss it if I don't do it...[when not exercising] you don't feel so good. You just feel stale...and I hate doing exercise really, but you realise that you need it...and you notice it over Christmas and when you go on holiday...just sitting around all the time, you get fed up really quickly, and then you go out for a bicycle ride or something"

It is interesting to note that, although Simon enjoys his cycling routines, and recognises the importance of health as well as the contribution of exercise to his state of health and well-being, he does not exercise during his working day, even if he describes the exercise facilities and programmes at work as being very important in the questionnaire. He says:

> "...I should go for exercise mid-day, but I don't, because I'm too lazy...Because I went through one of these things where...they asked you to do some exercise mid-day...for blood pressure...and I noticed that I dropped in blood pressure...by exercising half-way through the day...I should do it really, I might get round to it"

The exercise that Simon does seems to be one of the ways of retaining self-esteem levels due to the feelings of well-being it so clearly gives him. According to a literature review by Fox (2000), one of the ways by which physical activity works to enhance well-being is through perceived improvements in fitness. Certainly, for Simon, this seems to be the mechanism operating.

In conclusion, Simon may well be characterised as having low levels of well-being at the time of questionnaire administration as well as at the time during which he was interviewed. This is despite having changed jobs in the intervening period.

However, the recent low well-being that he feels is mainly due to a negative performance appraisal. He is uncertain about his future job situation, and feels a great lack of control. This seems to have negative consequences for levels of self-esteem. He also recognises that following the ranking of his performance, his work productivity has decreased. Some form of homeostatic mechanism seems to work to protect Simon's level of life satisfaction from dropping. In addition, exercise participation in the form of cycling is one effective way of making Simon feel good about himself. However, it seems that he would benefit from participating in even more physical activity, notably during the working day when he feels stressed. This may be achieved if the workplace encourages a form of lunch-time exercise which is enjoyable for him.

Overall description of cluster 3: "The physically active happy employee"

Members of this cluster describe themselves as doing a high amount of leisure-time physical activity as well as structured exercise and sports. In addition, this group is very satisfied with their jobs and feel a high level of enthusiasm and relaxation at work. Based on normative data, this group is also considered in the range "satisfied" with their lives (Pavot & Diener, 1993) with a mean of 26.03.

ALICE

From the moment Alice stepped into the interview room, I was clearly relieved to find a pleasant woman, with whom it was easy to establish rapport. From the start of the interview, Alice was keen to talk about the role of exercise in her life, and she started talking about it without even being prompted about it. The circumstances in Alice's life have changed within the past eight months (most notably because she has become pregnant), and that provided an interesting conversation.

More specifically, Alice is a 36 year-old unmarried woman, who is expecting her first child. She works as a marketing analyst in the organisation, and works forty-two hours per week. She has been doing her current job for just over one year, and sees the main demand of her job as "relationship management", which sometimes leads to sensitive situations, which are in themselves stressful. However, clearly she is not particularly faced with many of the everyday stressors that often appear in her job:

> "...you know some people get frustrated if something hasn't gone right. For me, I tend to get more upset if it's more a relationship thing with somebody, you know if it's...a relationship isn't going well or...that kind of thing...that's more likely...to affect my mood rather than, uhm, a delivery didn't come on time or you know that kind of stuff. I just think, yeah well, these things happen"

It is clear that the reason why Alice does not get upset by what she considers undue stressors at work is not due to any indifference about her job. In fact, the questionnaire indicated that it is very important for her to be good at her job, and the interview brought forward a similar conclusion. When I asked her how reliant she was on her job to feel good about herself, she replied:

> "...probably more than I like to admit...I'm reliant on it when I'm in it all the time, because...it's what you probably do that measures your self at the end of the day"

Her statement clearly shows the importance of the job to her levels of well-being. The questionnaire indicated a high degree of satisfaction with her job, which is confirmed in the interview ("I was probably up here somewhere [seven/eight out of ten]"). However, she says that it has become harder at work because of organisational changes and redundancies and, as a consequence, work overload.

The relative high importance of her job is also reflected in a statement she makes about how moods that she experiences at work may carry over into her home life:

> "Again, that's something you don't like to admit to, but if I've had a bad day at work, I'm probably not in such a good mood when I go home in the evening. But if you've had a good day at work, then obviously you do. It's also a question of your energy as well...if you've had a good day at work, you go home with more energy. If you have a bad day at work, you tend to go home and want to sit in a heap somewhere"

The relationship between her feelings at work with those outside of work is also evident when she talks about how satisfaction with her job may affect her overall satisfaction with her life:

> "...I think there are definite relationships. I spend eight hours, and actually more, inside [name of company], so if you're not happy with that, then it does have a huge impact on your life, because it's very difficult to be unhappy eight hours per day, and then sort of happy"

Although Alice describes the relationship between work and life satisfaction as relatively strong, it becomes clear that her life satisfaction works as a buffer against the stress encountered at work:

> "...I think that if you're satisfied with other stuff outside of work, then it's easier to cope with work if it's not going well...but I think even if you had a brilliant job, but you're unhappy with the rest of your life, then that wouldn't make your life good I don't think...So I'd feel, yeah, the job's important, but it's not what's going to make the other part of your life happy. Uhm, it's the satisfaction with your life maybe, yeah, that drives it. I think it helps, if you can be satisfied with your life, you can probably take a bit more stress and strain at work"

It seems that Alice is able to denigrate the impact that work-life has on her overall life satisfaction, and therefore it may enhance her well-being in times when she perhaps is not in control of the stress she encounters at work. Although she believes that life satisfaction may change over short periods of time, it quickly appears that she perceived it to be influenced by her overall achievements in life and her health.

She describes herself, and comes across, as satisfied with her life ("I think I'm probably at around eight or nine [out of ten] sometimes"). I asked her what contributed to her levels of life satisfaction, and in this connection, without any form of prompting, she talked about the importance of health and fitness:

> "...So for me it's things around...health and fitness. I put quite a lot of emphasis on that...feelings that outside of work, I'm achieving goals as well. So for me, in the past it's been a lot around travelling and that kind of thing, but always...deciding what it is that when you're eighty and sitting in your rocking chair, looking back at life and thinking, oh I wish I'd you know done that...I think it's always additional stimulation, constant learning that I'm looking for...to have new experiences outside of work"

It is clear that a feeling of self-actualisation is important to Alice, and she is able to imagine herself as how she would like to be in the future. This representation of herself in the future has also been referred to as possible selves (Markus & Nurius, 1986). According to Markus and Nurius' framework, Alice's possible self represents her goal to become a certain person in the future by means of providing her goals, plans to achieve them, and the affect associated with them, a specific cognitive form. Alice's possible self

in the future may also be used to provide a direct connection between her goals and the specific actions she takes to achieve them (Markus & Nurius, 1986). It seems that she uses exercise as a means of becoming a certain kind of person. Hence, exercise may work as a means of achieving important goals in life for her. Indeed, her exercise routine is clearly extensive and she provides a good description of it:

> "...it's funny, people say to me oh I do a lot, but I don't feel as if it's a lot, because a lot of if fits in with my life. So I'd cycle in and out to work most days, I'd go for a run maybe three or four times a week, and I go to the gym, and that's kind of also around work. It's not like I've made a special effort to do anything, it's just around work. So in terms of special effort, then I might go to the gym a couple of times a week, and then once a week I might go swimming. But again, it's like I get up on a Saturday morning, and it's, it's not a big effort. Your exercise routine is kind of like, oh it's nice to go for a swim on a Saturday morning"

The "lack of effort" that Alice refers to seems to clearly represent the enjoyment that Alice feels when exercising. However, her motivation to exercise clearly goes beyond her feelings of enjoyment and includes accomplishment and reaching goals:

> "...I think just the feeling it gives me probably...so I'm not a brilliant sportsperson, I was terrible at school sports, and I always think if I ever go back to a school reunion and people will be in shock...I bet now, I probably do a lot more [exercise] than most people actually...and I think it was borne out of, I think there's a sense of, uhm, I want to be fit like in my older age as well. I don't want to be somebody who, uhm, packs it all up. I want to be fit and healthy as I go through life. And I think, a lot of health stuff, I think is in you own hands as well. I think you need to do stuff for yourself. I don't have much sympathy for people that, uhm, you know, live completely unhealthy lives, and then expect the doctor to go and sort it all out for them. I think you're responsible for a huge amount of your own health, and that's a daily basis thing...I'll never be a great sportsperson, but I would be more driven by the feelings of well-being it gives me. The kind of foundation that I'm putting down for the future as well...and I think the side effect is that it does make you feel a lot...better"

Alice clearly sees a need to feel in control of her own body and her state of health. She uses exercise as a means of investing in her own health, and it has become an important aspect of her self-image. In line with schema theory (Kendzierski, 1994), she may be considered an exercise schematic, because 1) she considers being an exerciser as extremely descriptive of her self, and 2) being an exerciser is very important to her self-image. As suggested by Kendzierski (1994), according to this theory, exercise

schematics are motivated to exercise in order to verify their self-image as an exerciser. The self-image as an exerciser has clearly been built up with increasing experience with exercise. Alice also implies that she has internalised exercise with increasing experience, from being "terrible at school sports" to seeing exercise as an inherent part of her life.

Alice's motivation to exercise may be characterised as intrinsic. According to Vallerand and his colleagues (Vallerand et al., 1992, 1993), intrinsic motivation may be divided into three more specific motives, of which one, intrinsic motivation toward accomplishments, is focused specifically on the process of accomplishing a specific goal, and not so much on the end result. It is this type of intrinsic motivation that Alice seems to have. This is further illustrated in the following quote:

> "...I set myself challenges as well, like you know things, I have run one marathon, and, uhm, it wasn't a brilliant time or anything (laughing a little), but I like these sorts of things when you do kind of decide to join endurance events and, uhm, it's quite emotional as well, you know, when you've pushed yourself that little bit further then you sort of think you're good...I think you learn a lot about yourself...it's nice to be able to say I've run a marathon...I do a lot of cycling or I did a cycle journey...and you get a great sense of achievement, uhm, from that as well"

Exercise also has positive effects for Alice while she is at work. In stressful periods at work it is difficult for Alice to stick to her mid-day exercise routines. However, the sessions are imperative to her well-being because they seem to work as a mood-regulator:

> "...I find if I'm doing exercise it can have a big influence on my mood, and if I'm not able to exercise, I'll spiral downwards much quicker. Going through stressful times, sometimes the easiest thing to give up is my lunchtime runs, but in fact that drags me down even faster...that's one of the things I can do to try and lift myself...like I find if I've been for...a run at lunch hour, when I come back it's like a start of a whole new day, because you come back, you have a shower, you go back to your desk and you're starting the day all over. Whereas if you go to the restaurant and you just have lunch, you come back and you're probably feeling quite sleepy and tired...If I go for a run [at lunch time] it lifts me back up...whereas if I just go for lunch I probably just continue on a down"

The positive effects that Alice clearly perceives exercise to have, seems also to be important to her feelings of capability in her job. She explains it as follows:

> "I think this one is quite important, what you can do physically...for me certainly in terms of...my feeling of capability when I'm in my job...I saw it very strongly in a friend. I don't think I've seen the same reaction so strongly myself, but I could relate to it, where a friend of mine did...one of these outbound [adventure] courses...she came back from that and she was completely changed...the perception of other people was that she was sort of a quite a small, frail woman in sales...when she went on this course... she was pitched against all these sort of more archetypical kind of sales guys...of course she just thrashed them. And she came back and she just suddenly thought...why do I sit in meeting rooms, and feel intimidated by some...overweight middle-aged git in a suit...I can thrash that. And although I haven't had it as life changing as that, I think there is an element...if you're feeling good about yourself and feel physically strong, and you're in a challenging situation at work, you can rely on that...not feeling weak or vulnerable, you feel an awful lot stronger physically about being able to deal with that"

Although Alice refers to a friend, she talks about her friend to illustrate more strongly how she sees her own experiences, and may have interpreted the situation to fit in with her own self-image.

In light of the importance of exercise in Alice's life, it is not surprising that in situations in which she is not able to exercise to the extent that she wants to her well-being suffers to some degree. The fact that she is pregnant at the time of the interview forces her to decrease the intensity and frequency of exercise, and as a consequence she does not feel as good about herself as she did at the time when she was replying to the questionnaire. She says that "when I can't [exercise], there's a sense of being a little bit out of control", and points out that it is hard for her to have to cut down on her exercise because she is such a "physical" person.

In conclusion, the cluster characteristics of an active happy employee seem to match well with the information from the interview with Alice. She seems to have adequate coping resources to retain high levels of mental well-being. The strongest coping resource seems to be exercise. The impact of exercise clearly touches many spheres of Alice's life, and contributes greatly to her levels of well-being because it works for her to 1) achieve goals, 2) increase feelings of accomplishments, 3) feel better about herself, 4) make her feel in control of her life, 5) regulate her mood, and 6) enhance feelings of job capability. Her levels of well-being, however, have changed somewhat in the last eight months. Specifically, the fact that she is pregnant makes her feel less good about herself, because she is not able to exercise as much. In addition, the

changes that have happened in the organisation and notably the redundancies have made the work situation somewhat more difficult, and as a consequence her levels of job satisfaction have decreased since replying to the questionnaire. However, this is not detrimental to her well-being as her levels of life satisfaction works as a buffer against the stresses she encounters at work.

REBECCA

When I met Rebecca, she came across as a very open and assertive woman, and clearly seemed to have a high level of self-esteem. For example, she was very expressive and analytical about her feelings, suggesting a well-articulated self-concept, which is an indicator of high self-esteem (Campbell & Lavallee, 1993).

More specifically, Rebecca is a 31-year old manager in the company, who has been in her current job for one year. She is living with her boyfriend, but has no children. As a consequence of being a manager in the organisation, on average she works 45 to 50 hours per week. Indeed, she considers time spent at the job as one of the main demands of her job, along with conflicts among the group that she works with. Clearly, her current job demands a high level of self-esteem to function effectively:

> "...they are quite a demanding team, more so probably than the people I worked with before. They're a very direct team. I don't have problems dealing with...very direct people and people who are quite confident...[but] you have to be able to stand up and kind of hold your ground...so that's probably the only kind of pressure"

She does not have problems dealing with conflicts as work, maybe due to her high levels of self-esteem. It is interesting to note that, although she comes across as a person with a high level of self-worth, her questionnaire responses are indicative of no more than average levels of self-esteem (i.e. just above the midline of the scale). However, it becomes clear that she considers her self-esteem levels to have risen since replying to the questionnaire:

> "...I've probably gone up a notch in that...the relationship thing and then the work thing, feeling that I can contribute more"

At the moment she describes herself as having high levels of self-esteem, and describes some of the contributors to her feelings of self-esteem as follows:

> "...it's doing what makes you happy. And being with people that make you happy. So I know a lot of people in relationships, and I know that they're not happy...part of it might be if they have low self-esteem and therefore feeling that they can't sort things out and maybe move on or whatever, but I guess for me, I feel like I have high self-esteem because I'm happy doing what I'm doing...I get the support from my boyfriend to do the things that I want to do, and I equally do that to him...so the self-esteem thing I think is if you support and you go and do what you want to do then you have a...higher level of self-esteem and you feel better about yourself"

Along with theoretical positioning stating that self-esteem is a stable construct (e.g. Marsh, 1997), this is especially true for people with high levels of self-esteem, such as Rebecca, because self-esteem levels do not fluctuate as much depending on external criteria (Brockner, Wiesenfeld, & Raskas, 1993). She believes that the act of retaining self-esteem involves having a positive outlook on life, as well as about attitude ("...I'm a great believer that you can control those things yourself, and it's all about attitude...").

When examining Rebecca's questionnaire response with regard to life satisfaction, it is clear that it was high at the time. She believes it may even be higher now, due to an increasingly good relationship with her partner and her increased levels of job satisfaction. Life satisfaction seems to be retained because she perceives herself to have a great degree of control over how she copes with potential difficulties in life.

> "...you wake up in the morning and have a choice. You have a choice to be in a bad mood or a good mood, and I always try and take the good mood option, because...we got a lot going for us in our lives generally...sometimes, you know, you sort of think oh no, I'm not feeling so good today, and why not, it's all relative...I think just keeping the same attitude...I do actually. One of my family members is very ill at the moment, but...my attitude is well, you know, we'll do what we can to make it okay...I don't try to get too upset about it, because you have a positive attitude about things..."

According to Peterson (1999), maintaining perceptions of control facilitates well-being. In their composite theory of personal control, Peterson and Stunkard (1989) suggest that personal control comprises the beliefs that one is able to influence

outcomes and importantly, a belief that one can cope with the consequences of stressful outcomes. This theory seems to fit with Rebecca.

Rebecca sees the relationship between her overall life and her job as very strong, possibly reflecting her managing role in the organisation, although it is in line with how most other interviewees in this study see the relationship whether they are managers or not:

> "...I don't really know anyone who really hates their job, but are sort of satisfied with their life...because it's such a big part of your life...I think they are inextricably linked"

In light of the importance of work to Rebecca, it is important to note that her levels of job satisfaction are very high, both according to the questionnaire and her interview. In fact, her account reveals that the satisfaction with her job has increased within the past eight months:

> "...You look through that kind of the exciting new job...and part of it you're thinking oh no, I've got so much to learn, and then when you feel like you can start to contribute, then that's a positive thing as well...so I think that I probably...contribute that little bit more in my job"

It therefore seems that a certain degree of stability is needed for her to feel completely happy at work, and probably also some degree of control. In addition, feelings of productivity and job satisfaction seem to relate to a great extent for Rebecca ("...the main thing [contributor to job satisfaction] would be feeling that I've done the best job that I can do").

Although she is certainly not reliant on her relationship with her partner to be a happy person, the impression I got from the interview with Rebecca is that her relationship with her partner is fundamental to her well-being:

> "...he's just part of me...and we just get on so well. And that really helps me...we encourage each other...it's a mutual respect to things...if my personal relationship wasn't going well, that would come before my job...probably the relationship is number one"

One of the important things that Rebecca and her partner share is exercise. In fact, along with her relationship and her job, exercise is the major contributor to her life satisfaction ("...if I was to split between job, relationships and exercise...there'd almost be a third split..."). Although her questionnaire response indicated high levels of physical activity, her exercise regimen has actually increased since that time. She is currently exercising six days per week, including cycle spin classes four times a week, circuit and weight training several days per week, and running once in the week-end. Importantly, she considers the variability of the exercise as important ("...if you said to me, right, you need to go to the gym and work out six days a week, I couldn't do it"). Therefore, although she may be considered self-determined in her exercise behaviour, where reasons for her exercise behaviour include such things as enhancing self-esteem and increase her physical fitness and health which in turn makes her feel better, the variability in exercise is part of what makes exercise work for her. Clearly exercise is a self-determined behaviour:

> "...we do quite a lot of training and we do quite a lot in the morning. So, sort of three-four days a week we go to the gym, and so for me that's a really positive thing, because I get to work, and I'm, you know, I've done my exercise and feeling ready for anything"

Therefore, for Rebecca, exercise seems to work as a source of energy and serves as a buffering mechanism, because she feels she can cope with any stressors after exercising. It is not, therefore, surprising that exercise also serves other functions.

> "If I can have activity in the morning I will feel in a better mood than if I haven't done it..." and "...exercise clears your mind..."

As was the case with other interviewees, exercise seems to have repercussions for Rebecca's feelings of productivity at work. She notes that exercise and one of the outcomes associated with that, satisfaction with health, affects mood at work and productivity at work:

> "...these things [exercise and satisfaction with health]...they affect everything else...that makes me feel better, so therefore it makes everything more productive, and in a better mood, you know, because

> you're doing what you really want to do and you're satisfied that you're feeling healthy and that you can go and do these things"

It seems that the reason that exercise and satisfaction with health has generalising effects on feelings of productivity is through improved mood. The importance of exercise to Rebecca's life satisfaction is best illustrated through an account she gives of how a job offer was turned down:

> "...I travel sometimes and I don't get my six days of exercise, and that's fine you know, but certainly, say if work stops me exercising for a whole week, then I'll be worried about that...I actually was offered another job recently with the boss I used to work with, and I actually didn't take it, because it would have meant travelling every week, and I know that even though I could have probably fitted in exercise, then I probably wouldn't have done it. And then I know I would have resented the travelling. So I decided not to do it, because I would have been travelling two-three times a week...I was actually standing in the gym one morning...before I came into my house I thought, actually this is really important to me"

According to her statement, it seems that there is no doubt that exercise contributes greatly to her life satisfaction, and this may be partly through increased levels of physical well-being as suggested above and based on her questionnaire response which stated that this element of well-being is very important to her.

As a consequence of her increasing amount of exercise, she states that her levels of physical well-being have increased within the past eight months:

> "...that's probably the one that's got, probably got a bit better...I'm certainly feeling fitter than I've ever been in my life, but I've never been unfit. And I've never been many more than say half a stone or so heavier than I am now...So, yeah, I'd say that certainly over the last year, I have actually got fitter...because...I basically do more [exercise]"

Her statement is interesting, because her questionnaire response indicated a favourable discrepancy on physical satisfaction (i.e. her actual level of satisfaction with any attribute at least equalled the importance of that attribute), and she had maximum scores on satisfaction with health, fitness, appearance, and body shape.

In conclusion, Rebecca's story is very much like Alice's, and seems to fit in well with the cluster description of a physically active, happy employee. Since replying to the questionnaire, the positive scores on these dimensions have increased. Her levels of

physical activity have increased, and as a consequence her levels of physical well-being have increased, too. She is a very physical person, in that exercise is a major determinant of her well-being. This is documented in the effects exercise seems to have on her physical, work-related and global well-being. Rebecca's account showed that exercise seems to work as a buffering mechanism, as a mood-regulator, as a means of enhancing self-esteem, and it probably contributes to the feelings of control she has over her life. Exercise variability seems to be a key element to Rebecca's adherence to exercise, and which helps to bring about positive moods.

Overall description of cluster 4: "The physically unhappy employee"

Employees in this cluster are slightly older than employees in the other three clusters. In addition, although their Body Mass Index ($M = 27.65$) is not characterised as obese (BMI > 30), they are more overweight than members in the other clusters. Characteristic of this group of people is their very low scores on measures of physical well-being. In fact, as mentioned in Study 2, these levels are similar to those of an obese male population (Fox, 1990). In line with this, their levels of physical activity are lower than the levels of other groups. However, they are generally satisfied with their jobs, and feel a preponderance of positive affect over negative affect at work at the time of the questionnaire administration. Their levels of self-esteem, including global self-worth and perceptions of job competence, however, are not very high (although higher than for the members in the low well-being cluster), and satisfaction with life may be considered at the lower end of average.

KYLE

When I met Kyle (a pseudonym) he was clearly a friendly man, but at the same time he seemed somewhat insecure and shy, which was probably a reflection of his low levels of self-esteem. The behavioural manifestation of his insecurity and low levels of self-esteem was his quiet voice. As a consequence, although he was pleasant, this interview was a little bit more difficult to carry out, and his responses were generally shorter than those of the other interviewees. However, I believe I managed to get some important insight into the problems he was facing in his life.

Specifically, Kyle is a 43-year old married man with one adult child. Despite the cluster description of overweight individuals, he certainly does not appear overweight, which shows that some inter-variability is evident within each cluster. He is an experienced engineer, who is working as a project manager. He has been in his current job for six years, but has worked as an engineer in other companies for thirteen years prior to that. He currently works approximately 39 hours per week, and considers some of the demands of his job to be experience, knowledge, and working with other people. As he is a project manager, the stressfulness of his work clearly depends on the particular project he is working on at any given time. However, at the moment, in light of the changing business situation, there are certain factors inherent in the job which puts added pressure on Kyle:

> "We need to be very efficient in the way we work. Schedules are very tight…And as a result we're feeling stressed…so where we used to have one to two demands at a time, now we've got thousands…I find that quite stressful… People pay for them, so we have a reputation to maintain…Although I don't get so involved with customers, you feel the responsibility"

As with several of the other interviewees, it seems that feelings of lack of control contribute to the stress Kyle is feeling. Another major factor that contributes to Kyle's stress at the moment is the result of a performance evaluation:

> "I had my performance evaluation yesterday, and I'm aware that I need to increase my efficiency at work…In fact it's back to one…but I managed to do what the manager has asked me, so that's quite good…because I'm back on track"

The effect that the performance rating has on Kyle's life at work and in general is substantial and can be seen in the light of his low levels of self-esteem. According to Campbell (1999), people with low levels of self-esteem have great enhancement needs, and as a consequence they get more hurt in response to negative feed-back. Indeed, Kyle's self-esteem levels are low according to his questionnaire response and the interview reveals that he still considers himself low on this construct ("…problem one is that I have low self-esteem…If work goes well, it helps").

The satisfaction with his job is negatively affected as a consequence of the low performance rating, because his job satisfaction is contingent on the rewards he gets from the company:

> "...what people think about me is important, and how you're ranked and paid. That's the company's way of telling people how valuable you are to them...[that affects] satisfaction at work. If you're not being valued, then what's the point?"

In light of his statement, it seems that his well-being at work is largely dependent on achieving interpersonal standards and is therefore to some degree out of his control. This is characteristic of people with low levels of self-esteem, and may decrease self-esteem even more. In contrast to people with high self-esteem, Kyle does not attribute any of his short-comings to external factors. The problem is also that his experience of incompetence at work affects his life outside work:

> "If the manager doesn't appreciate what I'm doing, that's a very key to satisfaction or enjoyment in life...I think they [life satisfaction and job satisfaction] are very closely linked...I think it's one of those male things, where I find a lot of my status comes from my job. It's not the total, I have other important things in my life, my wife and my family and...my religion, but to be realistic my work takes up the majority of my time. If I'm enjoying my job, generally life is good (laughing)"

His statement indicates that he is not able to discount the negative aspects of his work, which then carry over into his overall assessment of his life. This supports the existence of a concept known as vertical bottom-up spill-over, in which (dis)satisfaction with a sub-ordinate domain (i.e. job satisfaction) spill over into (dis)satisfaction with a super-ordinate domain (i.e. life satisfaction) (Sirgy, Efraty, Siegel, & Lee, 2001). Therefore, unlike people for whom decreasing levels of job satisfaction does not affect their overall life satisfaction, Kyle does not seem able to use segmentation (preventing spill-over), and/or compensation (engaging in other pleasant activities in a different life domain to compensate for dissatisfaction in another) (Sirgy et al., 2001).

His level of life satisfaction in the questionnaire could be characterised as average (or "slightly satisfied"), but this level has decreased in the last eight months due to the following reasons:

> "...I was really healthy, and life was okay. A couple of things have happened since then which have made life tougher, but...generally life was going well, my children were happy, my wife was happy"

The other things which have happened that he refers, apart from the negative performance evaluation is the death of his father (he had just been to his father's funeral) and health problems. As indicated in the questionnaire and in the interview, of all the physical elements constituting physical well-being, Kyle sees health as the most important contributor to life satisfaction. Although he scored low on physical self-worth in the questionnaire, his physical well-being has clearly decreased further since then, because of his illness:

> "I had a brain operation eight months ago, and I think...I've just recently come to realise that...it might have affected the areas that actually help me to organise and plan my life. So I'm actually seeing a specialist to help me with that...This work with the neuro-psychiatrist will hopefully help me to get back to normal...I'd like to leave that area of my life so I can move on...so it [satisfaction with health] has taken me down in the last eight months, but...I don't see a need for feeling negative about the future"

He does believe that exercise is a means of achieving health. The type of exercise he does, cycling as a means of transportation forth and back from work, may be more appropriately labelled lifestyle physical activity. When he talks about exercise, he almost seems embarrassed, and is quick to stress that he does not engage in any sport. The reason for this is because of his age, what he describes as middle age. His motivation for physical activity may be characterised as identified regulation according to Vallerand (1997). The effects that exercise seem to have on Kyle's well-being is through satisfaction with health. Indirectly it may have an effect on life satisfaction to the extent that he perceives exercise to be effective in enhancing health, but for him, exercise is not directly linked with either work-related or global well-being:

> "I see exercise as a way of achieving health rather than for life satisfaction. I mean there is satisfaction of achieving a journey, but that's not my main concern, my main concern is to get amazingly healthy...but I find that certainly a lot more satisfaction at work has to do with the actual work itself"

In conclusion, Kyle represents the cluster description reasonably well with low levels of physical well-being. His physical well-being has decreased further during the past eight months due to health problems, but he sees physical activity as one means of achieving health. The stress that Kyle is currently under has negative impacts on his levels of life satisfaction, which have also decreased since replying to the questionnaire. Apart from health problems, this decrease is due to an unfavourable performance appraisal, which in turn negatively affects his level of job satisfaction and life satisfaction. This effect may be seen in light of his low self-esteem. It was suggested that the spill-over effects were due to a lack of segmentation and/or compensation strategies.

VERNON

Vernon (a pseudonym) was one of the last people I interviewed, and as a consequence, I believe the interview went relatively well. I got a lot of useful information that helped me to get a better sense of who he was as a person. He was clearly different from Kyle in that he came across as more extrovert, as, initially, he appeared more self-confident. However, it would later be revealed that his self-esteem was of a contingent nature.

Specifically, Vernon is a 39-year old married man with one child below the age of six. His job role differs from the rest of the participants as he is a consultant, and works as a contractor in the company. However, he has worked in the company for more than two years, and works approximately forty hours per week. He describes the form of stress he encounters at work as "frustration" because he is partly dependent on the information other people give him in order to carry out his job. As a consequence, the other demand of his job centres on conflicts with other people.

Interestingly, a lot of the interview is dominated by the importance he puts on social well-being, a category that was not adopted in the present series of research. The importance he attaches to this domain springs from previous difficulties in the area of communication with other people:

> "...I used to be fairly poor at getting on with other people, and that's changed quite a bit...it's about three years ago...I spent about six months working with a counsellor...I really hit rock bottom, so I went for some professional help, and that helped me to sort of...get my brain in gear really"

As a consequence of working with the counsellor, he believes that he has become a "better person". When I asked him what that meant, he replied:

> "...in terms of the way that I can see myself and the way that I actually get on with other people...your ability to perceive yourself is sometimes one of the poorest things that you have"

As a consequence of "becoming a better person", his life satisfaction has increased within the past few years. He considers his new transformed state as stable. That helps him to retain his well-being. Another factor that has improved his level of well-being is his improved relationship with his family, which he describes the most significant contributor to his life satisfaction. He describes his life satisfaction as eight on a scale from one (complete dissatisfaction) to ten (complete satisfaction). He believes that his life satisfaction is relatively stable and not likely to change over a period of eight months. This is interesting, because an inspection of his questionnaire responses clearly indicate that he is in the upper end of the "slightly dissatisfied group". Therefore, there is some discrepancy between his statement that life satisfaction is stable and should therefore be around eight out of ten eight months previously, and his actual response to the questionnaire. However, he has experienced low levels of life satisfaction for most of his life as he recalls:

> "I think, as an average I would say I've probably been quite low down the scale for quite a lot of time, due to...a number of sort of phases in my life that have not really worked out the way that I would have wanted them to work out"

In line with the cluster description, his self-esteem levels (global self-worth and perceptions of job competence) in the questionnaire were relatively low compared to established norms. Again, he indicates that self-esteem does not change over eight months. As for many of the other interviewees, his levels of self-esteem are clearly contingent upon reaching forms of interpersonal standards and achievements at work. When describing the contributions to his self-esteem, he says:

> "...I think it's driven by the reaction you get from people around you...if people are constantly being critical of what you do or reacting in a way that makes it obvious that they don't like or approve...of sort of you being

> there or who you are, then obviously…that has an impact…I think in the last few years, I've managed to find this sort of work that I think I'm good at. Well, it's not just me who thinks I'm good at it, other people tell me that I'm good at it…certainly when I've changed jobs in the last five years, it's always been at my request. I've always been requested to stay, and I've always said I'm going because I lost interest or whatever in the things they were asking me to get involved with…"

Indeed, it seems from his statement that he has a need to be appreciated by other people in order to feel good about himself. In addition, he states that the reason why he is relatively dependent on his job to feel good about himself is because "…it's an area where you tend to be more specifically judged than you might be in other ways…". These are relatively uncontrollable sources of self-esteem which are characteristic of individuals with lower levels of self-esteem. It is therefore surprising that he considers self-esteem to be a relatively stable construct.

In view of the above arguments, it may not come as a surprise that work and life outside work spill-over into each other to some extent. He explains it as follows:

> "…I think, even if you're only at work twenty-five percent of the time, that twenty-five percent can destroy the other seventy-five percent if it's bad enough. So…I think job satisfaction is more of an enabling thing than necessarily a thing in itself for me. It pays the bills and it doesn't destroy any of the happiness that I wanna get when I'm not at work"

The reason that work does not interfere excessively with his life outside of work, is because he currently describes himself as being in the "orange zone". This is a metaphor he uses to describe the circumstances under which work and life outside work affect each other positively or negatively. He describes it as follows:

> "I would see them [satisfaction with job and satisfaction with life] as being kind of three zones…there's like a sort of red zone, an orange zone and a green zone. And the green zone is when you're happy with something [at work], and obviously that kind of contributes to your total sort of satisfaction with life, it actually adds something in. The orange zone is when you're really not that happy but you're really not that unhappy either, and it [satisfaction with job] just kind of pays the bills and allows you to get on with the things that you are happy with when you're not there [at work]. And then the red zone is when it pisses you off so much that it just destroys whatever happiness there is that comes from whatever you can do outside of work anyway…and I think really your lifestyle as a whole is always gonna be ruined by any of the elements that make it up being in the red zone. You know, if your whole life's in the red zone, then coming to work is just not really gonna be that good no matter how good the work is. And the other way around also. I think that everything that you do has to

> try and sort of be within some kind of minimum level of satisfaction in order for the other things to actually come to the surface"

Vernon is implicitly indicating that his level of satisfaction with life and job do meet the minimum criteria, and hence do not have harmful effects upon one another. He may therefore retain his level of well-being. His interest in creating things outside of work, e.g. wood-work, also contributes to his level of current satisfaction and is an important part of his self-image. In addition, it is inherently linked within his work:

> "...the whole reason why I got into this sort of industry and the thing that...is the driver in my mental make-up is, fundamentally I like making things, be it a sort of logical, conceptual thing, which has no physical presence, or be it something that's actually carved out of a piece of wood...that sort of common theme...runs through...my sort of mentality really"

His interest in creating objects suggests that he is a creative person, and the need for him to be creative is partly met at work, too. This is likely to be one of the reasons that he describes his level of life satisfaction as relatively high.

Vernon does perceive himself to have some control over his work situation. For example, when comparing the importance of his relationship with his family and his work situation to his levels of life satisfaction, he clearly prioritises his relationship with his family. He is very clear about one of the reasons why this is the case: "...that's partly due to the fact that...not being happy at work is a relatively easier thing to deal with in the sense that you can vote with your feet".

Vernon's physical activity regimen consists of walking, as well as the occasional cycling during the summer months. He recognises that physical activity makes him feel better after sessions. Vernon is clear about how different types of physical activity have different advantages to his state of well-being:

> "I think if you're playing kind of game-type activities, there's obviously a sort of a social content to that, but equally sometimes physical activity can be a very solitary thing. I mean some people...they exercise and...the rest of the world gets closed out from that...sometimes I...go hill walking, and you tend to meet very few people and you're on your own, and you can just kind of find some space. I've always been a great lover of...mountains and large space...I find it very refreshing somehow...you tend to kind of think about things...you're just kind of walking away from the world as it were. So I think sometimes it can be

> as much a sort of a mental thing as the actual physical element you're putting into it..."

However, he still finds it hard to motivate himself to increase his levels of physical activity, although it bothers him that his fitness levels have decreased ("I just don't have the same strength, energy...I don't have as much power, I don't have as much endurance"). His motivation to exercise may be described as controlling according to self-determination theory (Deci & Ryan, 1985), as it is clearly not integrated with his sense of self. This may be demonstrated by the following:

> "...I keep saying to myself, I really should do this [exercise]...I feel a certain sort of pressure that I should, you know, all the medical advice says, you know, take care of yourself, look after yourself, so I feel...a sense of pressure being put on me which I don't particularly want to actually deal with...I think the fact that I see my health as ultimately not being the most important thing is probably one of the reasons why I struggle to find the...sort of enthusiasm to deal with it"

Out of all the interviews I carried out, I believe Vernon's account was the most discrepant from his questionnaire responses. This was particularly so for health. His questionnaire response indicated that being satisfied with his health was very important to him. However, he states in the interview that satisfaction with health does not have a great influence on his level of life satisfaction, which he illustrates by comparing it to social satisfaction:

> "I think as I've become a more sort of social person and social groups that I tend to sort of be part of are not very health-orientated in themselves...then my sort of whole life satisfaction which is a lot better than it was really stands from an improvement in my sort of social satisfaction, even though my actual physical health might have diminished. Whatever it was that my health allowed me to do wasn't particularly driving any great...life satisfaction per se"

In conclusion, it is clear that Vernon has been through a transformation in the past few years, in which he has worked on his social skills, which is a fundamental element of his well-being. As a result of "becoming a better person", his overall levels of life satisfaction have increased, and he perceives this transformation as being stable. This is one of the important reasons why his well-being does not decrease. A third source of well-being includes engaging in an intrinsically motivating behaviour; creating objects.

Despite of the above, his self-esteem can still be described as relatively low based on his responses to the questionnaire, and the interview clearly shows that he is dependent on performance at work and the reactions of other people to feel good about himself.

SUMMARY DISCUSSION

This discussion is structured into two main sections based on the objectives of the present study. First of all, I will discuss the findings which relate to the confirmation of the profiles, including potential reasons for a lack of congruence between the questionnaire responses and the interview accounts. Secondly I will deal with the exploration of psycho-social processes linking exercise and mental well-being.

Confirmation of profiles

The way in which the confirmation of the cluster profiles was examined in the present study was done by comparing the overall profile with the interview accounts of the individual participant. In addition, although no attempt was made to generalise the results of this interview study to a wider population, Table 5.3 presents a summary of the evaluation of discrepancies between the cluster profile and the interview accounts for each individual.

Table 5.3. Summary of discrepancies on levels of well-being (except job-related affect) between the cluster profiles and interview accounts for each participant

		LS		SE		JC		JS		PSW		PS	
		ND	D	ND	D	ND	D	ND	D	ND	D	ND	D
Self-assured	**Allan**	√		√		√			√	√			√
	Kate	√		√		√			√	√		√	
	Lucy		√	√			√		√		√		√
	Anthony	√		√		√		√		√			√
Worried/unhappy	**Lisa**	√		√		√		√		√		√	
	Simon		√	√		√		√		√		√	
Happy	**Alice**	√			√	√			√	√		√	
	Rebecca	√			√	√		√		√			√
Physically unhappy	**Kyle**		√	√		√			√	√		√	
	Vernon		√	√		√		√		√		√	

Notes.
1) LS=Life satisfaction, SE=Self-Esteem, JC=Perceptions of Job Competence, JS=Job Satisfaction, PSW=Physical Self-Worth, PS=Physical Satisfaction
ND=No discrepancy between cluster profile and interview account, D=Discrepancy between cluster profile and interview account
2) The variables representing affective states at work within the past week are not included as, by definition, they would be expected to change over this space of time.

It may be seen in Table 5.2 that out of sixty possibilities for matching the information between the cluster profiles and the interview accounts, in forty-three instances, the information in the interviews matched the individual cluster profiles. This summary serves as a rough checklist of the instances in which the profiles and the interview accounts match up and where they do not. As may be seen in Table 5.3, most of the interviewees are discrepant on at least one of the well-being indicators, with one exception. In Lisa's case (an "unhappy employee"), the information seemed to match up perfectly. The negative feelings she experienced at, and about, work seemed to greatly spill over into her feelings of worth as a person, her satisfaction with her life, and on psycho-somatic complaints. Her perceptions of low levels of job competence seemed to have been stable over a longer period of time, which may be why her levels of well-being have not changed in the eight months between questionnaire administration and the interviews.

In contrast, in Lucy's case (a "self-assured employee"), the information between the profile and her interview account did not match up very well. However, there were clearly two main factors for this discrepancy. First of all, the source of her self-esteem appeared to be different from some of the other individuals in her cluster. Specifically, her self-esteem seemed to fluctuate depending on how good she feels about doing her job. Her self-esteem was therefore described as contingent, as perceived successes, or external criteria, impact upon her self-esteem (Deci & Ryan, 1995). Secondly, the changes that have happened for her in the past eight months seemed to account for a lot of the changes in her well-being. For example, her feelings about her physical self have clearly decreased, probably mainly to do with her decreasing levels of regular exercise. Similarly, in Rebecca's case (an "exercising happy employee") a discrepancy existed on physical well-being. Specifically, her level of physical satisfaction is higher than the characteristics of the cluster profile, but it became clear that her exercise increase and perceptions of fitness attributed to her higher levels of physical well-being. Increasing levels of exercise is also likely to be one of the reasons for the higher levels of self-esteem which she describes in the interview. Alice, which is the other "exercising happy employee", also exhibited some discrepancy on self-esteem and job satisfaction. Her interview account shed light on the importance of exercise to her well-being, and the fact that becoming pregnant has prohibited her from engaging in exercise as much as

she would prefer. This, in turn, appeared to be the reason for decreasing levels of self-esteem. This decrease could partly be viewed in the light of exercise being central to her identity, and partly in light of the feelings of accomplishments and feelings of control that exercise seems to give her. Furthermore, the discrepancy on job satisfaction seems to be accounted for by the organisational changes taking place in the company between questionnaires administration and carrying out the interviews. These have led to increasing amounts of redundancies in the organisation.

Interestingly, the profile on life satisfaction for the interviewees who are described as "physically unhappy" (Kyle and Vernon) does not match up well. In Kyle's case, several aspects of his life have contributed to a decrease in life satisfaction within the previous eight months. First of all, he had some health problems, and secondly, he had a poor performance evaluation at work. The reason for the impact of the performance score on his life satisfaction may be the high importance he attaches to work, as well as a lack of compensatory and/or segmentation strategies which may serve to retain life satisfaction. In contrast, for Vernon, the discrepancy is due to an increase in life satisfaction over the past eight months, which he attributes to working on his ability to relate better to other people.

The above examples illustrate the extent to which any discrepancy between the cluster profiles and the individual interview account are accounted for either by changes in personal circumstances (e.g. reduced health, pregnancy), a change in lifestyle (e.g. increased or reduced exercise participation), organisational changes (e.g. increased amount of redundancies, increased job ambiguity), or by the ability to employ strategies that work to maintain well-being (e.g. segmentation strategies).

There are clearly other possibilities for any discrepancy between actual questionnaire responses and the interview accounts. First of all, it is possible that the cluster solution does not provide a reasonably valid profile of the mental well-being of the participants at the time of questionnaire administration. However given the amount of instances in which the interview accounts seemed to match the profiles, this is unlikely to be the reason for the discrepancies. Alternatively, it is possible that the instances of discrepancies are due to the different ways in which participants recall life events. For example, Craik and Lockhart (1972) theorised that happy individuals are prone to recall their positive life events more frequently than the negative events in their

lives, which as a result serves as a means of maintaining their longer-term happiness. It is possible that Cummins and Nistico's (2002) suggestion that positive cognitive bias serve to regulate any unhappy events that happen to an otherwise satisfied individual exist for some people. However, clearly, this is a speculative suggestion, and future research should aim to explore this issue.

Finally, in this section, a note should be made of the discrepancies on stable versus more specific elements of well-being. It would be expected that the more stable elements of well-being (i.e. life satisfaction and self-esteem) were the least discrepant, whereas the more changeable constructs (i.e. physical well-being) would show more discrepancies, as by definition, they are more likely to change over a relatively short period of time. In fact, the analysis and Table 5.2 reveals that there was no pattern to suggest that this was the case. For example, if discrepancies on life satisfaction and self-esteem are compared with discrepancies on physical well-being, it is clear that similar patterns appear. This is surprising given the hierarchical conceptualisation of well-being suggested throughout this series of research, as well as research on well-being which suggest that life satisfaction is stable due to homeostatic control (Cummins, in press). However, the results of this study suggest that, for some people, life satisfaction and indeed, self-esteem, are more changeable than previous research would suggest. It seems that, for some people, external circumstances may decrease global well-being when they are so severe as to threaten the foundation upon which the person's well-being is built. It was shown that this was particularly the case for individuals with low levels of self-esteem. Indeed, as noted by Campbell (1999) people with low self-esteem are more accepting of negative feed-back than individuals with high self-esteem. This, coupled with the importance of feeling competent at work, may likely be the reason why a negative performance appraisal led to a decrease in the global well-being for several of the interviewees in this study (see Kyle and Simon).

It was also shown that, for those interviewees who saw exercise as being important to their self-image, both life satisfaction and self-esteem were influenced to the degree to which exercise was sustained. For example, Rebecca chose to turn down a job because the consequence of taking up the job meant that she would not be able to fully sustain her exercise regimen. This example illustrates the importance of exercise in sustaining her satisfaction with life.

Illumination of psycho-social mechanisms linking exercise with mental well-being

As argued in the introduction to this study, qualitative research may be a particularly helpful method to establish causal links. Although limited, the interviews do provide some support for the contention that the relationship between exercise and well-being is causal, as most of the participants believed that exercise participation made them feel better in various ways. Table 5.4 illustrates a summary of some of the ways in which exercise seemed to work to enhance well-being for the participants.

Table 5.4. Suggested mechanisms explaining link between exercise and well-being

Mechanisms
Enhancing job productivity
Regulating mood
Coping with stress
Means of meeting important goals and needs
Time-out
Socialising
Mastery experience and enhancing autonomy

The examples in Table 5.4 illustrates that exercise may generalise not only to satisfaction with the physical self, but also to well-being and functioning at work and in life in general. Although the intention is not to focus on all of the suggested mechanisms, some of them are briefly reviewed here in light of the support from the interview accounts.

Several of the participants (see Allan, Kate, and Rebecca) felt that exercising at lunchtime served to enhance their levels of work productivity in the afternoon. This seemed to be due to increased levels of energy. In turn, considering the degree of importance attached to the job for most of the participants, increasing perceptions of productivity seemed to enhance feelings of capability within the job, and, for some, more global indicators of well-being such as self-esteem. Therefore, exercise may serve instrumental purposes and therefore indirectly affect well-being.

The enhancement of energy levels is also inherently linked to the ability of exercise to regulate affect and mood, as feelings of energy are often considered a type of

positive affect. The most consistent finding with regard to mechanisms linking exercise with well-being in the present study was that it often made the participants "feel better", which is a common lay belief and one that has been reported in previous literature (Shephard, 1996b). More specifically, several of the participants in the present study indicated that exercise may serve regulatory purposes. For example, Kate indicated that cycling home from work neutralised any negative feelings she may had experienced at work. In addition, Lucy experienced that swimming induced relaxation in stressful periods. Indeed, previous research has indicated that exercise may be a very effective strategy in changing a bad mood, in raising energy, and in reducing tension (Thayer et al., 1994). One of the strengths of Thayer et al.'s (1994) research was that it was based on a variety of approaches which examined the identity and effectiveness of a range of mood-regulating behaviours (e.g. exercise, relaxation techniques, eating, and reading). Exercise came out as one of the most favourable strategies, also as judged by psycho-therapists. Exercising as a mood regulator may therefore be one of the ways in which it enhanced well-being for some of the participants in the present study.

There was also some evidence to suggest that exercise works as an effective coping strategy against the experience of stress. For example, Allan indicated that although exercise did not directly affect his level of job satisfaction and feelings about his job, it served as a buffering mechanism against negative feelings about the job. In support of this finding, as argued in Chapter 2, adopting a cognitive perspective, Griffiths (1996) suggested that exercise may affect primary and secondary appraisal, thereby influencing the subjective experience of stressors.

There were also suggestions from the present study that exercise worked as time-out from everyday worries, also referred to as the distraction hypothesis, a mechanism that has been widely suggested in the literature (Morgan, 1997). There is some recent qualitative evidence that exercise may work as a distraction in individuals with severe mental problems (Faulkner & Sparkes, 1999). Faulkner and Sparkes (1999) also found that social interaction may work to improve feelings of well-being in this population. Another recent qualitative study with older adults has indicated that social interaction may be one of the important mechanisms linking exercise with subjective well-being (Stathi, Fox, & McKenna, 2002). This finding that was partly supported in the present

study, especially for those participants for whom social interaction was an essential element of well-being.

It may be argued that some of the above mentioned mechanisms are of an instrumental nature, as exercise improves well-being through its capacity to influence other aspects of life seen to be important (e.g. social interaction and enhancing job productivity). Tentatively, it may also be argued that for a few of the participants the effects of exercise were more integral to the self, as it was seen as an important part of their self-image (see Alice and Rebecca) and engaging in exercise was fundamental to their well-being, because it seemed to be part of who they were. Exercising served to meet personal goals and needs, especially for Alice, who used exercise more generally to enhance her sense of achievement, and as a means of becoming a certain person in the future.

The ability of exercise to enhance well-being may also be seen in the light of the degree to which the exercise behaviour has been internalised. Clearly, for Alice and Rebecca, who thoroughly enjoyed exercising, the effect of exercise on well-being was strong, and their motivation to engage in exercise may be intrinsic in nature, according to SDT (Deci & Ryan, 1985). In turn, Lisa did not see any benefit to exercising either physical, in terms of functioning at work, or to her life in general. Indeed, Lisa did not enjoy exercising, but engaged in exercise out of feelings of guilt. As argued in Lisa's section, her motivation to exercise is clearly described as introjected regulation according to OIT, where behaviour is controlled by one's feelings of guilt and shame (Ryan & Deci, 2000). Indeed, SDT proposes that autonomously regulated behaviours are associated with more positive cognitive, affective, and behavioural outcomes compared to behaviours which are regulated in a controlling manner (Vallerand, 1997). In the exercise domain, this theoretical position has been supported with regard to exercise intention (e.g. Chatzisarantis et al., 1997).

The results of this study have provided some new insight into potential mechanisms that may be partly specific to a corporate population. Although the proposed mechanisms cannot be generalised, the findings from the present study build on previous findings from this thesis which supported the existence of associative links between exercise and well-being.

In conclusion, the cluster profiles established in Study 2 appear to be reasonably well confirmed in the present study. The main implication of this result is that it provides support to the usefulness of establishing exercise and mental well-being typologies in an effort to identify employees in need or "at risk". Secondly, the study provided useful information with regard to possible mechanisms linking exercise with changes in well-being. Clearly, there is a need to test some of these suggestions in future research.

General comments

The interview accounts in the present study have served two main purposes. First of all, this study has provided some confirmatory support for the existence of distinct well-being clusters. The typologies may have functional implications in that they may provide for a means of identifying "at risk" individuals who may be coping poorly in life and at work. They may also shed light on the nature of the possible well-being deficits, i.e. whether they are specific or global.

Secondly, the interviews provided insight into the way that exercise may work to enhance well-being for some employees. This is an area of research that clearly requires more attention in the future. Specifically, the suggestion that exercise motivation may be an important consideration in the understanding of the relationship between exercise and well-being seems to be supported by the propositions of SDT. However, thus far, research is clearly lacking, and it would therefore be useful to aim to provide some generalisability to this suggestion in future research. If, indeed, it is shown that autonomously regulated exercise behaviours are more positively and more strongly associated with well-being, it has clear implications for how exercise interventions should be designed in order to maximise well-being.

In the present study, there was some indication that both active living activities as well as more structured exercise and sport may be effective in enhancing different types of well-being. For example, for at least one of the participants, active commuting to work was effective to regulate mood. For several of the other participants, more intensive types of aerobic activity (such as running or climbing) were paramount to retain or enhance well-being. It is not known which overall category of physical activity may be more strongly linked with well-being. Therefore, due to the general paucity of

research examining the links between well-being and categories of physical activity, it would be very useful to contrast structured exercise participation with active living activities when considering the link between physical activity and well-being.

CHAPTER SIX

STUDY FOUR: EXPLORING THE ROLE OF AUTONOMY FOR EXERCISE AND ITS RELATIONSHIP WITH WELL-BEING

The previous two studies in this thesis have focused on a means of targeting employees for exercise and well-being interventions in the workplace. Some confirmatory support was found for the existence of physical activity and well-being typologies in the previous chapter. However, there are two reasons why it may be important to re-examine well-being typologies in the present study. First of all, given that the sample in Study 2 consisted of employees from the private sector, it is important to examine whether the typologies can be confirmed with a sample of public sector employees. Secondly, the sample in Study 2 may have over-represented physically active employees. Therefore, in the present study, an effort was made to recruit employees engaging in varied levels of physical activity. Indeed, given the lack of research studies examining well-being typologies of individuals in corporate settings, this information may be important for future efforts to target employees for work-site interventions.

However, the aim of creating typologies was not to make a direct replication of the physical activity and well-being clusters from Study 2. Rather, when physical activity and well-being typologies were developed in Study 2, physical activity was operationalised as general physical activity participation calculated in terms of metabolic equivalents. The interviews carried out in Study 3 led to some new questions regarding overall categories of physical activity, and whether they might be differentially associated with the three well-being components examined throughout this thesis. Therefore, the focus here was on comparing well-being profiles of individuals engaging in different types of physical activity, such as exercise and sport activities, and active living activities (including walking and cycling). Specifically, the question of whether active living activities, such as walking and cycling to and from work, is as strongly associated with well-being as more structured forms of exercise and sport, is interesting from an exercise promotion point of view, and a question that has barely been addressed.

Some research does exist which has examined the relationships between types of physical activity or exercise and indicators of well-being. This research has generally compared low to moderate intensity physical activity with vigorous exercise. For example, as concluded in a review of the psychological outcomes of physical activity by Biddle and Mutrie (2001), evidence now exist to suggest that moderate intensity

exercise, which may include walking and recreational cycling, has a positive effect on psychological well-being, whereas the association is much less clear for vigorous intensity exercise, especially for beginning exercisers. In support of Biddle and Mutrie's (2001) review of literature, Szabo, Mesko, Caputo, and Gill (1998) examined the effects of four different modes of physical activity on exercise-induced feeling states in an experimental study. The four modes of physical activity were characterised by their different levels of exercise intensity (aerobic dance, weight training, martial arts, tai-chi and yoga). After controlling for pre-exercise affect, the authors found that, following the intervention, the group who engaged in tai-chi and yoga reported significantly higher levels of tranquillity and lower levels of distress, fatigue and exhaustion than some of the other groups. The weight training group exhibited significantly higher levels of post-exercise revitalisation than the other groups. Interestingly, the aerobic dance group did not seem to improve on any well-being construct even compared to the control group (i.e. a music appreciation group). These results do not directly lead to any conclusions with regard to the differences between groups of exercisers and groups of active living participants. However, they demonstrate that physical activities characterised by relatively low physical exertion may improve well-being just as higher intensity exercise does for some people in certain cases. It may be concluded that there is a lack of research examining well-being variables relevant to the population in the present thesis. Furthermore, there is a general paucity of research directly comparing the relationships between exercise/sport and well-being, and active living activities and well-being.

The second major part of the present study was focused on more specific exercise issues in this population. The qualitative study in Chapter 5 provided some suggestions for the means by which exercise may work to enhance well-being. Specifically, it was suggested that exercise motivation may play an important part in the understanding of the relationship between exercise and well-being. Exercise motivation as a construct has been the subject of a considerable amount of research in the past few decades, and more recent research has adopted the Self-Determination Theory (SDT) as an explanatory theoretical framework. The taxonomy of the Organismic Integration Theory (OIT), a sub-theory of SDT, was briefly outlined in Chapter 2. Its major contribution is that it proposes that motivation in any context can be conceptualised as a multi-dimensional

construct. Extrinsic motivation may range from passive compliance to active personal commitment (Ryan & Deci, 2000). Indeed, it is clear that, although an individual may have intentions to perform a particular behaviour, the regulation of their behaviour may reflect different degrees of autonomy or self-determination (Deci & Ryan, 1991). For example, the exercise behaviour of a woman who feels pressured to exercise due to societal norms is less autonomous than the exercise behaviour of another woman who considers exercise an important means of reaching a particular goal. Both women are said to be extrinsically motivated to exercise, but the regulatory processes guiding the behaviours are different (Deci, Vallerand, Pelletier, & Ryan, 1991). Whereas the first woman is controlled by external factors (external regulation), the second woman's motivation is characterised by being more self-determined (identified regulation). Specifically, recall from Chapter 2 that external regulation represents behaviours which are regulated through external means, such as rewards or punishment. Introjected regulation refers to behaviours which are beginning to be internalised, but they are not fully self-determined. These behaviours can be performed in order to gain social recognition or avoid internal pressures and feelings of guilt. With identified regulation, behaviour becomes more self-determined. The outcomes of the behaviour are highly valued and the behaviour is performed with less pressure even if it is not particularly pleasant. Finally, integrated regulation represents the most self-determined form of the internalisation process. It refers to behaviours which are performed out of choice in order to harmonise and bring coherence to different parts of the self (Deci et al., 1985, 1991).

The importance of internalising extrinsically regulated behaviours has been evidenced in several pieces of educational and medical research. For example, identified regulation, has been linked with more interest, enjoyment, and expending more effort compared to less autonomous extrinsically motivated behaviour in a school setting (Ryan & Connell, 1989). In addition, autonomously regulated behaviours have shown to be associated with higher levels of adherence to medications, and greater levels of maintenance to weight loss among a sample of morbidly obese patients (Williams, Rodin, Ryan, Grolnick, & Deci, 1998). Furthermore, an early study by Csikzentmihalyi and Figurski (1982) found that the lack of autonomy in everyday activities predicted negative emotions on a day-to-day basis. Indeed, the salience of being "agentic" in

one's own behaviour rather than acting out of external pressures was described in Chapter 2. A fully integrated behaviour is expressed as intrinsic motivation. Ryan and Deci (2000) describe intrinsic motivation as "the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore and to learn" (p. 70). According to SDT, everyone has a natural inclination towards mastery experiences and exploration which characterise intrinsically regulated behaviours (Ryan & Deci, 2000).

Very few studies have examined the role of exercise motivation in promoting different types of well-being. There is some evidence, however, that self-determined types of exercise regulation are significantly associated with more positive well-being consequences. For example, a recent study by Maltby and Day (2001) examined extrinsic versus intrinsic motives for exercising among individuals who varied according to the amount of time they had engaged in regular exercise. They showed that, in beginning exercisers, extrinsic motivations to exercise were significantly associated with higher levels of somatic symptoms, anxiety, social dysfunction, stress, and lower levels of self-esteem. In contrast, for those classified as habitual exercisers, intrinsic motivation to exercise was significantly associated with lower levels of somatic symptoms, anxiety, social dysfunction and depression, and a higher level of self-esteem. Another study by Rovniak, Blanchard, and Koestner (1998) found that people's motivations for exercising had implications for how they felt after a work-out. Specifically, those with integrated motivation (hence more self-determined reasons) for exercising felt more refreshed and revitalised after exercising. In contrast, those with introjected motivations for exercising did not improve on these well-being constructs after the exercise session (Rovniak et al., 1998). These studies provide some preliminary evidence that more self-determined motivation for exercise may be associated with better psychological well-being than exercise performed based on external or internal control. However, clearly, much more research is needed to examine these relationships, and as yet it is not known how exercise regulation may relate specifically to work-related well-being and global versus specific aspects of well-being. However, given the conceptual model developed in Study 1, it would be expected that exercise regulation, like exercise behaviour, would be more highly related to specific compared to global well-being indicators. A similar pattern would exist for work-related well-being; i.e. that exercise motivation would predict more specific constructs of work-

related well-being (i.e. work affect) compared to more global indicators, including job satisfaction and perceptions of job competence. In addition, the limited number of studies that have been carried out also indirectly indicate that any differences in well-being between different physical activity groups are more a reflection of the *regulation* of the behaviour rather than engaging in the behaviour per se.

In view of the above, the study had three main purposes. First of all, in an effort to compare the results of the present study with those of Study 2, the present study examined well-being typologies of University secretarial and administrative employees. The typologies were subsequently described on membership to the four physical activity groups, gender and job title distributions. Furthermore, the validity of the cluster solution was examined on indicators of negative affect and body mass index. Secondly, the differences in physical-, work-related-, and global well-being were examined between groups identified as engaging in different categories of physical activity (exercise/sport, active living activities, exercise/sport plus active living activities, and no physical activity). Thirdly, it was tested whether the well-being differences between the groups were still evident after controlling for self-determination to exercise. The fourth question examined whether autonomous or self-determined forms of exercise motivation are more positive predictors of indicators of well-being compared to controlled types of exercise regulation. Therefore, the main hypotheses of the present study were:

1. Distinct well-being typologies will exist which differ significantly in membership to physical activity groups, negative affective states at work, and body mass index. The cluster solution will produce well-being typologies which are similar to those from Study 2.
2. Significant differences will exist between the inactive group and the three other physical activity groups in the three components of well-being previously examined.
3. To the extent that the three physically active groups (i.e. sport/exercise, active living, and sport/exercise plus active living) differ significantly in well-being, these differences will become non-significant when controlling for self-determination to exercise.

4. Self-determined types of exercise motivation and controlled forms of exercise regulation will predict well-being differently. Specifically, self-determined exercise motivation will significantly predict well-being in a positive direction, and controlling types of exercise regulation will significantly predict well-being in a negative fashion. Furthermore, it is hypothesised that self-determined types of exercise motivation will predict specific measures of well-being (i.e. physical well-being and affective states at work) more strongly than more global indicators of work-related or context-free well-being (i.e. job satisfaction, perceptions of job competence, self-esteem and life satisfaction).

METHODS

Participants

The participants were 776 University secretarial and administrative employees at a UK University. This represented a 56.60% response rate to the whole secretarial and administrative population at the University. The mean age was 43.03 (*SD* = 11.54), and the sample consisted of 161 males (20.9%) and 611 females (79.1%) (4 people did not report their gender). Mean BMI was 23.95 (*SD* = 4.14).

The present sample was compared on several demographic variables (see Table 6.1) to those participants who chose not to take respond.

Table 6.1: Descriptions of respondents and non-respondents on demographic variables

	Respondents		Non-respondents	
	M	***SD***	***M***	***SD***
Age	43.03	11.54	43.70	11.29
	n	***%***	***n***	***%***
Males	161	20.75	147	24.71
Females	611	78.74	448	75.29
Secretarial	409	53.00	317	53.28
Administrative	362	46.80	278	46.72

Statistical analyses were also carried out to test whether any significant differences existed between the sample and the non-respondents in the variables in Table 6.1. First

of all, an independent-sample t-test was carried out on age to examine whether a significant difference existed between participants in the present study and the group who chose not to take part. The analysis revealed that there was no significant difference in age (t (1350) =-.633; p = .527).

In addition, a Pearson chi-square test was carried out to test whether the male to female distribution differed significantly between the present sample and the non-respondents. Once again, the result revealed that there was no significant difference between the present sample and those who chose not to reply in gender distribution ($\chi^2(1) = 3.29; p = .07$).

Finally, a Pearson chi-square analysis examined whether any significant differences existed in the distribution of secretarial and administrative employees between the two groups. The first analysis revealed that the groups did not differ significantly in job role distribution ($\chi^2(1) = .002; p = .96$). It would appear from the above analyses that the sample in the present study was representative of the population from which it was drawn.

Instruments

Six of the scales used in the present study were also used in studies 1 and 2, and are therefore not described in detail in this chapter. These scales were the Satisfaction With Life Scale (SWLS), global self-worth and perceptions of job competence from the Adult Self-Perception Profile (ASPP), the job satisfaction scale, the Job Affect Scale (JAS), physical self-worth from the Physical Self-Perception Profile (PSPP), and the physical satisfaction scale. However, another two scales were added to this study and physical activity groups were created based on a different physical activity scale. The scales are described below.

Exercise identity

An exercise identity scale by Anderson and Cychosz (1994) was used to measure the salience of participants' identification with exercise. The scale consists of nine items, which are scored on a Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). An example item is "I need to exercise to feel good about myself". Anderson and Cychosz (1994) demonstrated support for the scale with a high level of

test-retest reliability. An exploratory factor analysis identified one factor which explained 67.6 percent of the total variance. The factor loadings of the items were all acceptable.

In terms of validity of the scale, they found that exercise identity was significantly related to four indicators of exercise behaviour. Furthermore, a regression analysis revealed that 47 percent of the variance in exercise identity was explained by these indicators of exercise participation.

Exercise motivation

The Behavioural Regulation in Exercise Questionnaire (BREQ) by Mullan, Markland, and Ingledew (1997) was used to measure types of exercise motivation. The four types are external, introjected, identified and intrinsic motivation. The scale consists of fifteen items and is scored on a Likert-scale ranging from 0 ("not true for me") to 4 ("very true for me"). Example items are "I exercise because other people say I should" (external regulation), "I feel ashamed when I miss an exercise session" (introjected regulation), "I value the benefits of exercise" (identified regulation) and "I get pleasure and satisfaction from participating in exercise" (intrinsic motivation).

Mullan et al. (1997) identified a four-factor model, after the deletion of the amotivation scale, which exhibited acceptable discriminant validity and internal consistency. A Confirmatory Factor Analysis (CFA) supported the four-factor structure of the scale as it revealed acceptable goodness of fit indices. In addition, multi-sample analysis showed that the questionnaire is equally applicable to males and females (Mullan et al., 1997). A recent study by Wilson, Rodgers, and Fraser (2002) examined the construct validation of the BREQ using CFA to assess the factor structure of the scale. Their results once again confirmed the four-factor structure of the scale, as the CFA revealed acceptable fit indices. In addition, the standardised factor loadings were moderate to strong.

In support of the validity of the BREQ, Wilson, Rodgers, and Fraser (2002) also found that more self-determined exercise motives (i.e. identified and intrinsic motivation) showed stronger associations with exercise behaviour. In support of Wilson et al.'s (2002) study, a previous study by Mullan and Markland (1997) revealed that

BREQ scores were able to discriminate between individuals characterised as being at different stages in the exercise adoption process.

In order to carry out the analysis examining the role of self-determination in determining the differences between exercise groups in well-being, a self-determination index was calculated based on the scores on the BREQ. The self-determination index is obtained by weighting the scores of each type of motivation and then adding up these scores to create a single index. Weights are assigned to the different types of motivation depending on their position along the self-determination continuum (i.e. intrinsic motivation (+2), identified regulation (+1), introjected regulation (-1), and external motivation (-2)). In brief, the higher the self-determination index, the more self-determined individuals are. The index has displayed high levels of reliability and validity (Vallerand, 1997).

Physical activity

In the present study, physical activity groups were determined based on information from a modified version of The Aerobics Center Longitudinal Study Physical Activity Questionnaire (Blair, 1997). The questionnaire provides questions on a range of physical activities, including sports, exercise and lifestyle physical activities. The questionnaire consists of categorical data (i.e. yes/no), as well as open-ended answers. Participants are asked to provide information regarding their activity levels within the last three months, in terms of frequency per week, intensity level and duration per session. They are requested to indicate those activities they do regularly (i.e. minimum once per week for fifteen minutes per session or more).

The adequate validity of this questionnaire is reported in a study by Kohl, Blair, Paffenbarger, Macera and Kronenfeld (1988) in which they assessed the use of physical activity recall to accurately estimate physical fitness (measured as maximal treadmill performance). Validity of the physical activity questionnaire was supported by a multiple correlation of 0.65 between physical fitness and age and physical activity questions.

Blair's (1997) questionnaire seemed an appropriate option to use in the present study because it assesses different types of physical activity. However, the scale was only used to roughly categorise individuals into the physical activity categories of

interest to this study (1. exercise and sport, 2. active living activities, 3. exercise/sport plus active living activities, and 4. no physical activity). The categories of physical activity that were used in the present study were derived from the following criteria based on the individual's responses to the questionnaire:

1. Exercise and sport: Those who only engaged in any exercise and sport activity characterised as vigorous in Ainsworth et al. (2000) at least once a week for minimum fifteen minutes duration per session.
2. Active living: Those who did walking and/or cycling at least once a week for minimum fifteen minutes duration per session.
3. Exercise/sport plus active living: Those who did 1 *and* 2
4. Inactive: Those who engaged in less than one session per week lasting 15 minutes duration per session of any physical activity.

Procedures

Prior to any data collection, contact was made with one key personnel officer at the University to discuss possibilities for conducting the survey with secretarial and administrative employees at the University. A special emphasis was placed on the possibility of obtaining demographic data on all these employees in order to ensure adequate representation. Permission was eventually granted and a list containing names and demographic information was received. The list was subsequently coded, a coding system that was only known to the author and a second investigator in the project. Before hard-copies of the questionnaires were distributed to the employees, all questionnaires were coded based on this list, using removable stickers. These stickers were chosen in order to allow for flexibility regarding anonymity. Although participants were ensured complete confidentiality of their responses, those participants who wanted to remain anonymous were allowed to remove the sticker from the questionnaire before returning it by post. An e-mail explaining the purpose of the study was sent to all employees eligible to take part in the study one day prior to mailing the questionnaires (see Appendix 4). E-mails reminding the participants of the study were sent three and ten days later (see Appendices 5 and 6). A copy of the questionnaire can be found in Appendix 7.

Data protection

For the first time in this thesis, respondents to the survey were not anonymous but identifiable via a coding system that allowed for a comparison between participants and non-respondents. This was an imperative procedure, as I wanted to ensure that the sample was representative of the population from which it was drawn. However, given that participants were not anonymous, extra care was taken to protect their identities. After all the questionnaires had been coded (see "procedures"), the list that identified the codes was kept safely in a locked cabinet at the University. After the data entry procedures, the returned questionnaires were kept in a separate locked drawer at the University. This procedure would safeguard against any data protection issues that might have arisen and complies with University departmental procedures.

RESULTS

Reliability and Factor Analyses

Reliability analyses were carried out on all the scales which were used in the present study, and the analyses showed that they all exhibited satisfactory internal reliabilities, according to Cronbach's (1951) criterion of $\alpha > .70$ (see Table 6.2).

Table 6.2: Summary of alpha reliability coefficients for all scales

Scales	α
SWLS	.88
ASPP: Global self-worth	.88
ASPP: Perceptions of job competence	.78
Job satisfaction scale	.87
JAS: Enthusiasm at work	.82
JAS: Relaxation at work	.73
JAS: Nervousness at work	.79
JAS: Fatigue at work	.82
PSPP: Physical self-worth	.92
Physical satisfaction scale	.83
Exercise identity scale	.93
Behavioural Regulation in Exercise Questionnaire*	.82

* Based on sample of $n = 638$ (exercising groups only)

Factor analyses were only carried out for those scales which had not been used in any of the previous studies. The criteria used to judge the results of the factor analyses have been described in Study 1, and are therefore not repeated here. In short, Principle Axis factoring was used as the extraction method for the exercise identity scale. In addition, free solutions were used to determine the number of factors using the criterion of eigenvalue > 1.

Table 6.3. Summary of factor analyses results for the exercise identity scale

	Eigen-value	Explained variance (%)	Factor loadings
EXERCISE IDENTITY	5.82	64.68	
1) Consider self an exerciser			.78
2) Usually include exercise in description of self			.80
3) Numerous exercise goals			.74
4) Exercise central to self-concept			.85
5) Needing exercise to feel good about self			.78
6) Others see me as someone who exercises			.81
7) Being an exerciser means more than just exercising			.74
8) Feeling loss if forced to give up exercising			.82
9) Exercising is something I think about often			.66

It may be seen in Table 6.3 that the free solution produced a single factor from the exercise identity scale, and consequently the solution was not rotated. The one factor that was extracted explained a relatively high degree of variance in the items; 64.68 percent. All factor loadings in the scale were consistently high according to the criteria set by Kline (1994) (i.e. a factor loading is acceptable if it is > .30), and the exercise identity scale therefore had an acceptable factor structure.

Confirmatory Factor Analysis (CFA)

As the BREQ by Mullan et al. (1997) is a well-established motivation scale within physical activity settings, it was decided that, instead of performing an exploratory factor analysis, it was more appropriate to carry out a CFA to test the factor structure of the scale. In contrast to exploratory factor analysis, CFA examines the *a priori* factor structure of a questionnaire and evaluates whether it "fits" a data set. To carry out the analysis, EQS 5.7 (Bentler, 1995) was used. As may be recalled from Study 1, a good factor structure is implied when the chi-square (x^2) statistic is non-significant. Additional goodness of fit indices were used to evaluate the appropriateness of the solution (Hair et al., 1998). These indices included the Comparative Fit Index (CFI), the Bentler-Bonett Nonnormed Fit Index (NNFI), the Standardised Root Mean Square Residual (SRMR), the Root Mean Square Error of Approximation (RMSEA) and its 90% confidence interval (CI). A study by Hu and Bentler (1999) showed that a good model fit (i.e., a good factor structure) is achieved when the CFI and NNFI values are close to .95, the SRMR is close to .08, and the RMSEA is close to .06.

The results showed that the proposed four-factor structure was very good: Scaled x^2 (84) = 342.01, $p < .01$; robust CFI = .96; NNFI = .95; SRMR = .04; RMSEA = .07; 90% CI of RMSEA = .06 to .07. Furthermore, the factor inter-correlations did not indicate multicollinearity as they ranged from -.10 to .68. The factor loadings (all were significant at the .01 level) are presented in Table 6.4.

Table 6.4. Standardised factor loadings for BREQ

"I exercise because..."

Items	Loadings	R^2
External Regulation		
Other people say I should	.680	.463
My friends/family/spouse say I should	.854	.729
Others will not be pleased if I don't	.715	.512
I feel under pressure from my friends/family to exercise	.765	.585
Introjected Regulation		
I feel ashamed when I miss an exercise session	.731	.534
I feel like a failure when I haven't exercised in a while	.786	.617
I feel guilty when I don't exercise	.814	.662
Identified Regulation		
It's important to me to exercise regularly	.790	.624
I value the benefits of exercise	.824	.679
I get restless if I don't exercise regularly	.677	.458
I think it is important to make the effort to exercise regularly	.775	.600
Intrinsic Motivation		
It's fun	.856	.732
I get pleasure and satisfaction from participating in exercise	.911	.829
I enjoy my exercise sessions	.925	.856
I find exercise a pleasurable activity	.906	.821

Descriptive Statistics

The distributions for age and gender of the participants in the present study are presented in Table 6.5.

Table 6.5. Crosstabulations of gender and age

Age Group	Gender		Total	Percentage of total sample
	Males	Females		
20 or less	1	9	10	1.29
21-25	7	32	39	5.03
26-30	16	72	88	11.34
31-35	17	76	93	11.98
36-40	21	75	96	12.37
41-45	15	79	94	12.11
46-50	24	64	88	11.34
51-55	23	89	112	14.43
56-60	29	79	108	13.92
61-65	6	20	26	3.35
Over 65	2		2	0.26

Table 6.5 shows a relatively large proportion of both females and males in the older age groups. Specifically, the largest proportion of females was between 51 and 55 years old, whereas the largest group of males was the 56 to 60 year olds. In addition, the job role distribution of males and females was analysed and the results are presented in Table 6.6.

Table 6.6. Crosstabulations of gender and job role distribution

Job role	*N* by gender			% by gender	
	Male	Female	Total	Male	Female
Secretarial	24	385	409	14.91	63.01
Administrative	137	225	362	85.09	36.82

Table 6.6 shows a large difference between males and females in job role distribution, and this difference was significant (Pearson $\chi^2(1) = 118.85$; $p = .00$). Specifically, a significantly larger proportion of females were secretarial staff compared to males. In addition, significantly more males were employed in administrative jobs compared to females.

The sample consisted of a mix of part-time (16.9%) and full-time (83.1%) employees. To examine whether these groups of employees exhibited similar levels of well-being, independent samples t-tests were carried out. The results of the tests revealed that there were no significant differences between the groups in either life satisfaction (t (749) = -1.56; p = .119), self-esteem (t (739) = -.24; p = .811), perceptions of job competence (t (737) = -.13; p = .897), job satisfaction (t (754) = .61; p = .542), relaxation at work (t (752) = -1.26; p = .209), fatigue at work (t (752) = .967; p = .334), physical self-worth (t (741) = .067; p = .947), or physical satisfaction (t (754) = -1.00; p = .317). The only significant differences between the two groups were in enthusiasm at work (t (752) = 3.51; p = .000), and nervousness at work (t (752) = 3.15; p = .002).

The means and standard deviations of all well-being constructs by gender for the whole sample are presented in Table 6.7.

Table 6.7. Means (M) and standard deviations (SD) for all constructs by gender

	Males		**Females**	
	M	***SD***	***M***	***SD***
Life satisfaction	22.25	6.48	22.73	6.50
Self-esteem	17.59	3.69	17.39	3.45
Perceptions of job competence	12.22	2.23	12.32	2.12
Job satisfaction	35.42	10.62	36.06	9.62
Enthusiasm at work	18.21	4.50	16.76	4.51
Relaxation at work	10.68	2.93	10.99	3.08
Nervousness at work	10.38	3.93	9.14	3.39
Fatigue at work	7.98	3.25	7.58	3.17
Physical self-worth	15.26	3.94	13.90	3.55
Physical satisfaction	12.81	3.49	12.57	3.49

To compare whether any significant differences existed between the gender groups in any of the well-being constructs in the present study, a MANOVA was carried out. The MANOVA was significant (Pillai's criterion = .084; F (10, 717) = 6.59; $p <$ .001). A univariate analysis revealed that males and females differed significantly in enthusiasm at work (F (1) = 13.50; $p <$ .001), nervousness at work (F (1) = 14.63; $p <$ .001), and physical self-worth (F (1) = 16.85; $p <$ .001). It is interesting to note from Table 6.7, that although males were significantly more enthusiastic at work compared to females, they also had significantly higher levels of nervousness at work. This may reflect the fact that more men tended to have administrative jobs, whereas more women were employed in secretarial jobs. Finally, the fact that men had significantly higher levels of physical self-worth than women fits with findings from Study 1 and previous research (Fox, 1990).

Furthermore, the results shown in Table 6.7 allow for a comparison of well-being status between the present sample and the sample from Study 1. The well-being profile of the present sample is relatively similar to the well-being status of the sample in Study 1. For example, just as in Study 1, females reported slightly higher levels of life satisfaction than males. However, the present sample also seemed to feel better about their sense of competence in their job than the sample in Study 1. In addition, enthusiasm at work appeared higher, and fatigue was somewhat lower in the present sample compared to the other sample.

Characteristics of physical activity groups

Table 6.8 presents the total and the gender distribution in each physical activity category.

Table 6.8. Gender distribution in physical activity groups

	N by gender			% by gender	
	Male	**Female**	**Total**	**Male**	**Female**
1. Exercise and sport	11	52	63	6.83	8.51
2. Active living	71	264	335	44.10	43.21
3. Exercise/sport plus active living	65	235	300	40.37	38.46
4. No physical activity	14	60	74	8.70	9.82

To examine whether any significant differences existed between the two groups, a Pearson chi-square analysis was carried out. The findings revealed that there were no significant differences between males and females in distribution in physical activity groups (Pearson $\chi^2(3) = .924$; $p = .82$).

Exercise identity was included in this study as a secondary variable in order to provide some information regarding possible distinctions between the groups. To this end, a one-way ANOVA test was carried out to examine the differences between the physical activity groups in exercise identity. The ANOVA was significant ($F(3, 755) = 62.11$; $p < .001$). The means, standard deviations and results of the post-hoc Tukey test are presented in Table 6.9.

Table 6.9. Mean differences between exercise groups in exercise identity

Exercise groups	Exercise identity	
	M	***SD***
1. Exercise and sport	2.95[a]	.12
2. Active living	2.03[b]	.05
3. Exercise/sport plus active living	2.88[a]	.05
4. No physical activity	1.82[b]	.11
	F	***p***
	62.11	.00

Note: Exercise groups with the same subscripts in the same column do not differ significantly at $p < .05$

The results of the ANOVA illustrates that the exercise/sport group have a significantly higher level of identification with exercise compared to both the active living group and those classified as doing no physical activity. These results show that those engaging in active living activities do not generally consider themselves as exercisers. This could be expected given that exercise identity should develop with increased experience with exercising (Anderson & Cychosz, 1994).

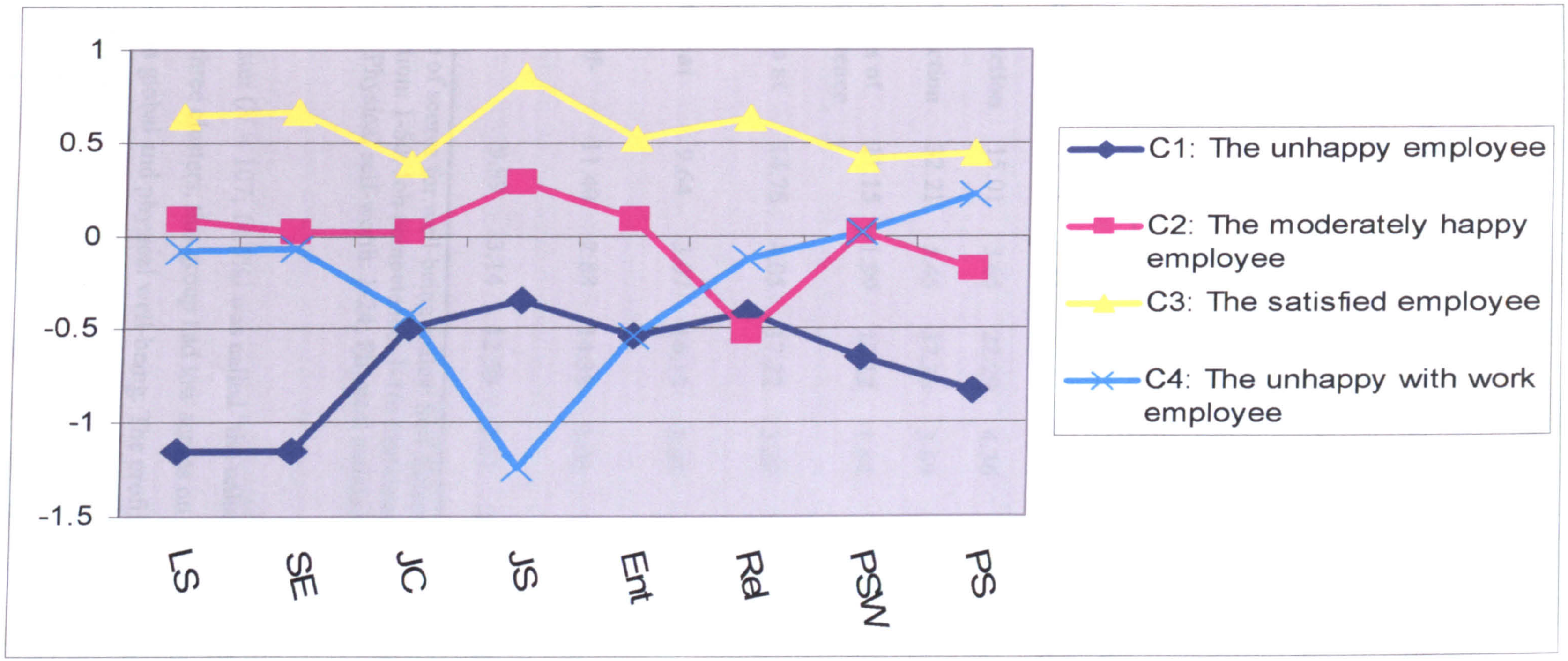
Examining well-being typologies

In order to substantiate the findings from Study 2 with the present sample, a hierarchical cluster analysis was carried out including the well-being indicators only. The exercise

groups were not included in the analysis, as they were categorical in nature, but were instead used to examine differences between the cluster groups. In addition, because the age variable did not work well to discriminate among the clusters in Study 2, it was not included in the present analysis. Furthermore, BMI was used as an additional means of validating the cluster solution in the present study.

The procedures for carrying out a hierarchical cluster analysis to examine well-being typologies have previously been described (see Study 2). Ward's hierarchical method was used, and the Agglomeration schedule coefficients were examined. Results revealed that there was a fairly large increase in the coefficients from a four- to a three cluster solution, and it was therefore concluded that the data could best be summarised as a four-cluster solution. Figure 6.1 presents an illustration of the standardised scores on each variable in the cluster solution for the four groups.

Figure 6.1. Well-being clusters (all scores are standardised)



LS = Life Satisfaction, SE = Self-Esteem, JC = Perceptions of Job Competence, JS = Job Satisfaction, Ent = Enthusiasm at work, Rel = Relaxation at work, PSW = Physical Self-Worth, PS = Physical Satisfaction

A description of the cluster groups and comparison with those of Study 2

Table 6.10 presents the unstandardised means and standard deviations of the well-being indicators used to form the cluster solution for each cluster group.

Table 6.10. Means (M) and Standard Deviations (SD) of the variables used for each cluster

	1) The unhappy employee		2) The moderately happy employee		3) The satisfied employee		4) The unhappy with work employee	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Self-esteem	13.68	2.85	17.47	2.57	19.29	2.87	15.97	3.33
Life satisfaction	15.01	3.65	22.29	4.36	26.98	4.58	19.39	6.75
Job satisfaction	32.21	5.45	37.30	3.69	43.41	4.56	20.44	6.40
Perceptions of job competence	11.15	1.99	12.12	1.84	13.20	1.96	11.29	2.01
Enthusiasm at work	14.76	4.05	17.22	3.29	19.39	4.11	13.53	3.85
Relaxation at work	9.64	3.07	10.13	2.67	12.37	2.59	10.04	3.07
Physical self-worth	11.40	2.88	14.38	3.03	15.35	3.78	13.50	3.33
Physical satisfaction	9.89	3.14	12.59	3.31	13.73	3.14	12.55	3.42

Note: Range of scores for well-being scales: Self-Esteem: 1-24; Life Satisfaction: 1-35; Job Satisfaction: 1-50; Job competence: 1-16; Enthusiasm at work: 1-30; Relaxation at work: 1-20; Physical self-worth: 1-24; Physical satisfaction: 1-30

Cluster 1

The first cluster (N = 107; 14.6%) was called "the unhappy employee" because relative to the other three clusters, this group had low scores on most well-being variables, especially on global and physical well-being. The profile of this cluster group therefore appears relatively similar to the "unhappy employee" cluster in Study 2. However, there are some differences. It appears that their unhappiness derives from sources external to work. Although their scores on work-related well-being were relatively low compared

to some of the other clusters, these scores are higher than their scores on the other well-being variables. In addition, their mean levels of both life satisfaction and self-esteem are lower than all the clusters from Study 2, including those of the "unhappy employee". Indeed, according to Pavot and Diener's (1993) normative data using the SWLS, this cluster is considered as being at the lower end of "slightly dissatisfied" with life (Range 15-19). Another major difference between the "unhappy employee" clusters in the two samples is that the group in the present study have much lower levels of physical well-being. In fact their scores on these variables are lower than those of the "physically unhappy" employee in Study 2, and lower than norms produced based on obese populations (Fox, 1990). Although it is not possible to conclude whether this cluster's low level of self-esteem is partly due to low level of physical self-worth, the possibility exists.

Cluster 2

The second cluster ($N = 192$; 26.3%) was called "the moderately happy employee", because relative to the other cluster groups, all their well-being scores were moderate. Although no "moderately happy" employee cluster was found in Study 2, this cluster most closely resembles the "self-assured" cluster from that study, except that this group was did not have particularly high levels of self-esteem or life satisfaction. For example, their mean level of life satisfaction scores indicate that they may be considered "slightly satisfied" with life according to Pavot and Diener's (1993) norms. In addition, their self-esteem levels are somewhat lower than norms produced by Messer and Harter (1986; Range 19.86-20.40) based on full-time working men and women. On perceptions of job competence, this group scored only slightly lower than the "self-assured" cluster group in Study 2, but somewhat lower than norms produced by Messer and Harter (1986; Range 14.24-14.44). Interestingly, however, the cluster in the present study had higher levels of job satisfaction than the "self-assured employee" group in Study 2.

Cluster 3

The largest group of employees in the present study ($N = 300$; 41%) were those who appeared to be coping well in life in general and at work specifically. They were called the "satisfied employee" because they exhibited relatively high levels of job

satisfaction, were more relaxed at work, and had relatively high levels of life satisfaction and self-esteem. They seemed most similar to the "exercising happy employee" in Study 2, with both cluster groups being characterised as "satisfied" with life according to Pavot and Diener's (1993) criteria (Range 26-30). Self-esteem levels were also comparable and appeared to mirror norms produced by Messer and Harter (1986; M = 19.86-20.40). The "satisfied employee" cluster was also the group with the highest level of perceptions of job competence and job satisfaction, and their scores on these variables surpassed those of the "exercising happy employee" in Study 2. During the week of replying to the questionnaire, this group also exhibited the highest level of positive affective states at work, although their scores failed to reach the levels of the "exercising happy employee" cluster in Study 2. Finally, their physical well-being scores were also higher than the other clusters in this sample, yet somewhat lower than a general adult population (M = 16.89; Sonstroem et al., 1992), and considerably lower than the cluster in Study 2. The latter finding may be due to the "satisfied" cluster not engaging in as much exercise or physical activity as the highly active cluster in Study 2.

Cluster 4

The final cluster (N = 132; 18.1%) was called the "unhappy with work employee" because they exhibited very low levels of job satisfaction. In fact, it is much lower than the job satisfaction of the "unhappy employee" cluster in Study 2. Coupled with low levels of job satisfaction are perceptions of low levels of job competence when compared to Messer and Harter's (1986) normative data. Maybe not surprisingly, they have the lowest scores on enthusiasm at work compared to the other clusters, a score that is similar to the level of enthusiasm exhibited by the "unhappy employee" cluster in Study 2. Although it appears from Figure 6.1 that levels of global well-being is average compared to the other clusters, in absolute levels their level of life satisfaction can be described only as "slightly satisfied" with life (Pavot & Diener, 1993). In addition, self-esteem levels are lower than norms produced by Messer and Harter (1986). Finally, although on a relative level, the physical well-being of this cluster seemed to be average, levels of physical self-worth were similar to those of an obese male population (Fox, 1990; M = 13.40).

Cluster description on membership to physical activity groups

Recall that the clusters established in Study 2 differed from the present cluster analysis because physical activity was not included in the solution in the present study. However, given the relative similarity of the well-being profiles between the two studies and findings from Study 1 demonstrating the relationships between exercise and the components of well-being, it would be expected that differences existed between the cluster groups in this study in membership to the categorical physical activity groups which were developed for the present study. The distribution in membership to each of the physical activity groups between the clusters is presented in Table 6.11.

Table 6.11. Physical activity group membership distribution in the clusters

Cluster groups	Exercise/ Sport		Active living		Exercise/ sport plus active living		No physical activity	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
1) The unhappy employee	5	4.67	42	39.25	46	42.99	14	13.08
2) The moderately happy employee	16	8.33	82	42.71	79	41.15	15	7.81
3) The satisfied employee	28	9.33	129	43.00	120	40.00	23	7.69
4) The unhappy with work employee	10	7.58	64	48.48	44	33.33	14	10.61

Table 6.11 shows that rather large proportions of people in all cluster groups were regularly engaged in both exercise and sport plus active living activities. Out of the four cluster groups, the largest proportion of employees doing no physical activity was the "unhappy employee". A Pearson chi-square test was carried out to examine whether significant differences existed in the distribution in physical activity groups between the four cluster groups. However, the chi-square was not significant (χ^2 (9) = 8.42; p = .49). Therefore, the support for the cluster solution in Study 2 witnessed above did not extend to significant differences in overall categories of physical activity between the cluster groups.

Cluster description on gender and job title distribution

Gender distribution in the cluster groups were analysed and the results are shown in Table 6.12.

Table 6.12. Gender distribution in the clusters

Cluster groups	**Males**		**Females**	
	n	**%**	***n***	**%**
1) The unhappy employee	20	13.07	87	15.13
2) The moderately happy employee	38	24.84	151	26.26
3) The satisfied employee	67	43.79	233	40.52
4) The unhappy with work employee	28	18.30	104	18.09

The largest percentage of both male and female employees was in the cluster "the satisfied employee". It appears from Table 6.12 that the female to male distribution between the cluster groups was similar, and, indeed, a Pearson chi-square analysis revealed that there were no significant differences between the clusters in gender distribution (χ^2 (3) = .76; p = .86).

Job title distribution in each cluster was also analysed and the results are seen in Table 6.13.

Table 6.13. Job title distribution in the clusters

Cluster groups	Secretarial		Administrative	
	n	%	*n*	%
1) The unhappy employee	54	50.47	53	49.53
2) The moderately happy employee	110	57.29	82	42.71
3) The satisfied employee	154	51.33	146	48.67
4) The unhappy with work employee	69	52.27	63	47.73

It may be seen from Table 6.13 that there was a relatively even distribution of secretarial and administrative employees between the cluster groups. To test whether any significant differences existed in job title distribution between the clusters, a Pearson chi-square analysis was carried out. The analysis showed that there were no significant differences between the groups (χ^2 (3) = 2.06; p = .56).

Cluster solution validation

In order to validate the cluster solution, the differences between the cluster groups in nervousness and fatigue at work were examined through a MANOVA. The MANOVA was significant (Pillai's trace = .226, F (6, 1416) = 30.11, $p < .001$.). The univariate tests showed that the groups differed significantly among each other in both variables. Post-hoc tests with Bonferroni adjustment revealed an identical pattern on the two variables. Specifically, the "unhappy employee" differed significantly from the "moderately happy employee" (p = .03) and the "satisfied employee" (p = .00), and the "satisfied employee" differed significantly from all the other groups (p=.00) in both nervousness and fatigue at work. The univariate analysis is presented in Table 6.14.

Table 6.14. Mean differences of cluster groups in nervousness and fatigue at work

Cluster groups	Nervousness at work		Fatigue at work	
	M	***SD***	***M***	***SD***
1) The unhappy employee	10.47_a	.33	8.76_a	.29
2) The moderately happy employee	9.36_b	.24	7.29_b	.21
3) The satisfied employee	8.00_c	.19	6.51_c	.17
4) The unhappy with work employee	11.39_a	.29	9.61_a	.26

Note: Cluster groups with the same subscripts in the same column do not differ significantly at $p < .05$

A one-way ANOVA test was also carried out to examine the differences between the groups in BMI. This ANOVA was also significant (F (3, 716) = 5.04; $p < .01$). The means, standard deviations, and results of the post-hoc Tukey test are shown in Table 6.15.

Table 6.15. Mean differences of cluster groups in body mass index

	Body Mass Index	
	M	***SD***
1) The unhappy employee	25.27_a	.40
2) The moderately happy employee	23.73_b	.30
3) The satisfied employee	23.79_b	.24
4) The unhappy with work employee	23.32_b	.36

Note: Cluster groups with the same subscripts in the same column do not differ significantly at $p < .05$

It may be seen from Table 6.15 that although none of the cluster groups could be identified as obese on average (BMI = 30 or ≥), the "unhappy employee" had a significantly higher BMI than the other three groups. This difference would be expected as the "unhappy employee" cluster had very low levels of physical well-being. This finding provides further support for the validity of the cluster solution.

Relationships between types of exercise motivation and mental well-being components

In order to examine whether any significant differences existed between indicators of well-being and types of exercise regulation, bivariate correlation analyses were carried out using Pearson's product moment correlation coefficients. The results are illustrated in Table 6.16.

Table 6.16. Bivariate correlations among types of exercise regulation and all mental well-being constructs

	2	3	4	5	6	7	8	9	10	11	12	13	14
1. LS	.62**	.29**	.40**	.35**	.25**	-.22**	-.24**	.32**	.30**	-.03	-.10**	.08*	.20**
2. SE		.39**	.40**	.38**	.27**	-.30**	-.26**	.47**	.35**	-.11**	-.17**	.05	.18**
3. JC			.38**	.35**	.22**	-.29**	-.25**	.17**	.10**	-.04	-.10**	.00	.11**
4. JS				.54**	.27**	-.38**	-.43**	.16**	.15**	-.07	-.06	.07	.13**
5. Ent					.24**	-.13**	-.44**	.30**	.23**	-.02	-.03	.13**	.16**
6. Rel						-.44**	-.04	.18**	.16**	-.06	-.07	.01	.08*
7. Ner							.26**	-.15**	-.13**	.09*	.07*	.01	-.06
8. Fat								-.21**	-.17**	.10**	.06	-.08*	-.13**
9. PSW									.63**	-.20**	-.12**	.26**	.27**
10. PS										-.24**	-.17**	.22**	.27**
11. Ext											.32**	-.09*	-.15**
12. Introj												.33**	.09**
13. Ident													.63**
14. Intrin													

LS=Life Satisfaction, SE=Self-Esteem, JC=Job Competence, JS=Job Satisfaction, Ent=Enthusiasm at work, Rel=Relaxation at work, Ner=Nervousness at work, Fat=Fatigue at work, PSW=Physical Self-Worth, PS=Physical Satisfaction, Ext=External exercise regulation, Introj=Introjected exercise regulation, Ident=Identified exercise regulation, Intrin=Intrinsic exercise motivation

As might be expected, it is clear from Table 6.16 that all well-being constructs were significantly related in the expected directions to a small or moderate degree (except relaxation and fatigue at work which were unrelated). Specifically, it is noteworthy that enthusiasm at work is moderately correlated with physical self-worth. In addition, it is noteworthy that the different types of exercise regulation were to a large extent significantly, albeit weakly, related to the indicators of well-being. Specifically, intrinsic motivation to exercise was most strongly related to well-being compared to less self-determined forms of exercise regulation. In fact, the only variable that intrinsic motivation to exercise was not significantly related to was nervousness at work. In contrast, intrinsic motivation was most strongly correlated with indicators of physical well-being, followed closely by its relationship with life satisfaction and self-esteem. External, introjected and identified exercise regulation also showed significant associations with several well-being variables, especially with physical- and global well-being. These findings provide some preliminary support regarding the potential role of exercise motivation in the relationship between physical activity and mental well-being.

Differences between physical activity groups in well-being

As may be recalled from the introduction to this chapter, one of the other main aims of the present study was to compare whether any significant differences existed between the four physical activity groups in the three components of well-being included in this thesis. This analysis extends the findings from Study 1, in that physical activity was operationalised here as overall types of physical activity rather than energy expenditure expressed as METs.

Three MANOVAs were carried out to test the well-being differences between the physical activity groups. The first MANOVA examined whether the exercise groups differed significantly in physical self-worth and physical satisfaction. The MANOVA was significant (Pillai's criterion = .056; F (6, 1480) = 7.16; $p < .001$). Table 6.17 presents the results of the univariate differences among the four exercise groups in physical self-worth and physical satisfaction.

Table 6.17. Mean differences between physical activity groups in physical well-being measures

Physical activity groups	Physical self-worth		Physical satisfaction	
	M	***SD***	***M***	***SD***
1. Exercise and sport	2.51_a	.08	3.36_a	.11
2. Active living	2.24_b	.03	3.03_b	.05
3. Exercise/sport plus active living	2.50_a	.04	3.34_a	.05
4. No physical activity	2.24_b	.07	2.87_b	.10
	F	***p***	***F***	***p***
	11.48	.00	11.02	.00

Note: Physical activity groups with the same subscripts in the same column do not differ significantly at $p < .05$

Table 6.17 shows a consistent results across the two physical well-being constructs, as the exercise/sport group differed significantly from the active living ($p = .01$; $p = .03$) and the physically inactive group ($p = .048$; $p = .01$) in physical self-worth and physical satisfaction, respectively, but not from the exercise/sport plus active living group. Hence, these results indicate that it is those who engage in more structured forms of sport and exercise activities who feel significantly better about their physical selves compared to individuals engaging in either regular active living activities or no regular physical activity.

The second MANOVA examined differences between the exercise groups in work-related well-being. This MANOVA was also significant (Pillai's criterion = .044; F (18, 2187) = 1.82; $p < .05$). Table 6.18 illustrates the results of the univariate differences in the work-related well-being constructs.

Table 6.18. Mean differences between exercise groups in work-related well-being measures (df = 3, 739)

Exercise groups	JS		JC		Ner		Fat		Rel		Ent	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1. Exercise and sport	7.44_a	.26	3.25_a	.07	1.53_a	.08	1.75_{ab}	.10	2.72_a	.10	2.83_{ab}	.10
2. Active living	7.10_a	.11	3.05_a	.03	1.60_a	.03	2.02_a	.04	2.71_a	.04	2.76_b	.04
3. Exercise/sport plus active living	7.29_a	.12	3.05_a	.03	1.51_a	.03	1.81_b	.046	2.79_a	.05	2.94_a	.04
4. No physical activity	7.23_a	.24	3.07_a	.06	1.58_a	.07	1.86_{ab}	.09	2.75_a	.09	2.80_{ab}	.09
	F	***p***	***F***	***p***	***F***	***p***	***F***	***p***	***F***	***p***	***F***	***p***
	.86	.46	2.30	.08	1.45	.23	4.74	.00	.53	.66	3.00	.03

JS = Job Satisfaction, JC = Job Competence, Ner = Nervousness at work, Fat = Fatigue at work, Rel = Relaxation at work, Ent = Enthusiasm at work

Results from Table 6.18 show that the significant differences were in fatigue and enthusiasm at work. Specifically, a post-hoc Tukey test revealed that the differences in fatigue at work were located between the active living group and the active living plus sport/exercise group ($p = .02$). With regard to enthusiasm at work, again the post-hoc analysis revealed that the differences were located between the active living group and the active living plus sport/exercise group ($p = .01$). Hence, it would appear that it is more favourable to be involved in a combination of active living and sport and exercise activities in terms of feelings of enthusiasm and fatigue at work.

Finally, a MANOVA was carried out to examine the differences between the groups in global well-being (i.e. self-esteem and life satisfaction). However, the MANOVA was not significant (Pillai's criterion = .010; F (6, 1474) = 1.23; $p > .05$). In other words, the four exercise groups did not differ significantly in either self-esteem or life satisfaction. This finding is somewhat surprising given findings from Study 1 which found that physical activity quintiles differed significantly in levels of life satisfaction.

Differences between physically active groups in components of well-being when accounting for self-determination to exercise

Due to the existence of significant differences between the physical activity groups in physical- and work-related well-being, the next step was to test whether, in the physically active groups (groups 1, 2, and 3), any differences were still significant when controlling for self-determination to exercise. Based on the rationale presented in the introduction to this chapter on the importance of autonomy and self-determination to exercise, it would be expected that any significant differences that may have existed between the physically active groups (i.e. groups 1, 2, and 3) would become non-significant when controlling for self-determination to exercise.

To examine these hypotheses, several steps were necessary. First of all, the exercise motivation scores were re-calculated into a self-determination index, in order to obtain one score which represented degree of self-determination to exercise (see "Instruments" in the methods section). Secondly, MANOVAs were carried out which examined the differences between groups 1, 2 and 3 *only*, in order to test whether the MANOVA analyses remained significant after leaving out the group described as

inactive (Means and standard deviations for each of the variables are not described here, as they were reported in the above analyses).

The first MANOVA examined the differences between the three exercise groups in physical well-being, and results revealed that the MANOVA was significant (Pillai's criterion = .050; F (4, 1360) = 8.79; $p < .001$). The groups differed significantly in both physical self-worth ($F = 16.74$; $p = .00$) and physical satisfaction ($F = 11.61$; $p = .00$), and the univariate analyses revealed that the significant differences were located between groups 1 and 2 (sport/exercise and active living) and groups 2 and 3 (active living and sport/exercise plus active living).

The second MANOVA revealed that significant differences also existed between the three groups in work-related well-being (Pillai's criterion = .047; F (12, 1322) = 2.63; $p < .01$). Specifically, the groups differed significantly in perceptions of job competence ($F = 3.64$; $p = .03$), enthusiasm at work ($F = 4.64$; $p = .01$), and fatigue at work ($F = 6.91$; $p = .00$). Again differences between the groups in these variables were located between groups 1 and 2 (sport/exercise and active living) in perceptions of job competence and fatigue at work, between groups 1 and 3 (sport/exercise and sport/exercise plus active living) in perceptions of job competence and between groups 2 and 3 (active living and sport/exercise plus active living) in enthusiasm and fatigue at work.

The third MANOVA examining the differences between the three groups in global well-being was not significant (Pillai's criterion = .008; F (4, 1340) = 1.38; $p > .05$). This would be expected based on the results of the previous MANOVA examining the differences between the four physical activity groups in global well-being, which was also non-significant.

Based on the above analyses, the third step was to carry out statistical tests to examine the differences between the three exercise groups in those components of well-being that were significant in the previous analyses when accounting for self-determination to exercise. To this end, two MANCOVAs were carried out; one on physical well-being, and one on work-related well-being.

With regard to physical well-being, the combined dependent variables (i.e. physical self-worth and physical satisfaction) were significantly associated with the covariate (i.e. self-determination to exercise) (Pillai's criterion = .139; F (2, 656) =

52.74; $p < .001$). Follow-up univariate analyses showed that self-determination to exercise was significantly associated with both physical self-worth (F (1, 657) = 79.38; $p < .001$) and physical satisfaction (F (1, 657) = 88.49; $p < .001$). However, after adjustment for self-determination to exercise, the differences between the physically active groups in physical well-being became non-significant (Pillai's criterion = .011; F (4, 1314) = 1.75; $p > .05$).

On work-related well-being, the combined dependent variables (i.e. perceptions of job competence, job satisfaction, and the four factors of affect at work) were also significantly related to self-determination to exercise (i.e. the covariate) (Pillai's criterion = .041; F (6, 643) = 4.60; $p < .001$). Univariate analyses revealed that self-determination to exercise was significantly associated with perceptions of job competence (F (1, 648) = 10.05; $p < .01$), job satisfaction (F (1, 648) = 14.48; $p < .001$), enthusiasm at work (F (1, 648) = 18.13; $p < .001$), and fatigue at work (F (1, 648) = 14.53; $p < .001$). However, again when adjustment was made for self-determination to exercise, the relationships between the exercise groups in work-related well-being became non-significant (Pillai's criterion = .031; F (12, 1288) = 1.70; $p > .05$). In other words, assuming that self-determination to exercise was equal between the physically active groups, no significant differences would have existed between the physical active groups in physical-or work-related well-being. These findings demonstrate the potential role of self-determination to exercise in better understanding the relationship between physical activity and indicators of well-being.

Prediction of well-being from exercise motivation

Multiple regression analyses, using the Enter method, were carried out to examine whether the different types of exercise regulations predicted the indicators of well-being differently for those who reported engaging in regular physical activity or exercise. Table 6.19 presents a summary of the results.

Table 6.19. Prediction of global, work-related, and physical well-being from four types of exercise motivation

	b	*t*	R^2	*F*	*p*
LIFE SATISFACTION			.065	11.53	.000
External	.06	1.36			
Introjected	-.14	-3.23***			
Identified	-.01	-.25			
Intrinsic	.24	5.11***			
SELF-ESTEEM			.071	12.65	.000
External	-.02	-.37			
Introjected	-.16	-3.77***			
Identified	-.02	-.42			
Intrinsic	.23	4.80***			
PERCEPTIONS OF JOB COMPETENCE			.027	4.49	.001
External	.01	.28			
Introjected	-.11	-2.49*			
Identified	-.00	-.07			
Intrinsic	.14	2.78**			
JOB SATISFACTION			.029	4.97	.001
External	-.03	-.70			
Introjected	-.08	-1.77			
Identified	.04	.72			
Intrinsic	.13	2.61**			
ENTHUSIASM AT WORK			.047	8.16	.000
External	.02	.43			
Introjected	-.07	-1.69			
Identified	.12	2.37*			
Intrinsic	.13	2.71**			
RELAXATION AT WORK			.012	1.98	.096
External	-.01	-.24			
Introjected	-.05	-1.20			
Identified	-.06	-1.08			

Intrinsic	.11	2.19*			
NERVOUSNESS AT WORK			.013	2.25	.062
External	.04	.99			
Introjected	.07	1.66			
Identified	.03	.52			
Intrinsic	-.07	-1.46			
FATIGUE AT WORK			.032	5.40	.000
External	.07	1.62			
Introjected	.09	1.94			
Identified	-.04	-.78			
Intrinsic	-.10	-2.15*			
PHYSICAL SELF-WORTH			.148	28.71	.000
External	-.09	-2.27*			
Introjected	-.17	-4.16***			
Identified	.24	4.99***			
Intrinsic	.15	3.30**			
PHYSICAL SATISFACTION			.145	28.32	.000
External	-.13	-3.31**			
Introjected	-.18	-4.31***			
Identified	.18	3.65***			
Intrinsic	.17	3.86***			

*$p < .05$, **$p < .01$, ***$p < .001$

Table 6.19 shows that most regressions were significant, with the exception of relaxation and nervousness at work. In other words, the set of exercise regulations significantly predicted life satisfaction, self-esteem, perceptions of job competence, job satisfaction, enthusiasm at work, fatigue at work, physical self-worth and physical satisfaction. The amount of variance explained in the regressions was relatively small. The reason might be due to the high correlations between the predictors, especially intrinsic motivation and identified regulation. Indeed, the R square shows the unique variance of each predictor, and if the predictors are highly correlated, they share a lot of common variance, which is excluded from the R square value.

The results showed that all four types of exercise motivation explained a higher degree of variance in the physical well-being variables compared to the more global constructs of well-being as well as work-related well-being. This would be expected given that exercise behaviour has been shown to relate more strongly with facet-specific aspects of well-being throughout this thesis. In addition, with regard to work-related well-being, the amount of variance explained in the significant predictions was smaller than the variance explained in global well-being. This may be because a lot of the exercise that participants took part in occurred outside the confines of the working day (i.e. evenings and week-ends), and therefore the regulation underlying the behaviour would not be linked strongly to well-being experienced at work.

An inspection of the b- and t- values for the individual types of exercise regulation in Table 6.19 reveals that external motivation to exercise was a non-significant predictor of global well-being and work-related well-being but significantly predicted scores on physical well-being. In contrast, introjected exercise regulation significantly predicted both global well-being indicators and physical well-being variables, but only perceptions of job competence among the work-related well-being variables. As hypothesised in the introduction to this chapter, introjected exercise regulation predicted these indicators of well-being in a negative direction. In other words, controlled types of exercise motivation appeared to be associated with lower levels of well-being.

With regard to the ability of more self-determined forms of exercise motivation in predicting well-being, identified exercise regulation predicted the physical well-being variables and enthusiasm at work, but not life satisfaction or self-esteem. Hence, valuing the outcomes of exercise and physical activity was significantly and positively associated with higher levels of physical well-being and enthusiasm at work. Intrinsic motivation was the most consistent predictor of well-being, and it predicted all the well-being variables in the expected directions. Interestingly, intrinsic motivation to exercise predicted life satisfaction and self-esteem more strongly than it predicted the indicators of physical well-being. Indeed, the fact that intrinsic motivation to exercise was a significant predictor of global well-being seems to support Maltby and Day's (2001) findings.

In sum, the findings examining the hypothesis that autonomous regulations for exercising are significantly better predictors of the different indicators of well-being

were clearly consistent, and demonstrated that, indeed, being self-determined and autonomous for exercising may have significantly more beneficial effects on certain types of well-being than controlled types of exercise regulation.

DISCUSSION

The present study had multiple purposes. The first hypothesis examined the existence of well-being typologies among a sample of University secretarial and administrative employees. The second hypothesis examined whether any significant differences existed in well-being between the physically inactive employees and those characterised as doing different types of physical activity. Thirdly, it was hypothesised that, to the extent that any significant differences existed in any of the well-being variables between the three physically active groups, those differences would disappear when accounting for self-determination to exercise. The final hypothesis examined whether more self-determined types of exercise motivation would predict well-being in a positive direction, and whether controlled types of exercise regulation would predict well-being negatively. In addition, it was hypothesised that self-determined forms of exercise motivation would predict more strongly specific elements of well-being compared to global elements of well-being.

With regard to the first aim of the present study, a hierarchical cluster analysis found that the data could be best summarised according to four different clusters. Whereas one cluster could be characterised as "moderately happy", for members of "the unhappy employee", low levels of well-being were mainly global in nature, with individuals having low levels of satisfaction with their lives and having a low sense of self-worth, also compared to normative data. For the "unhappy with work employee" well-being problems stemmed from a low level of satisfaction with work. In contrast, members of the fourth cluster generally felt happy at work. The validation procedure showed that the clusters were distinct as they differed significantly in negative affective states at work and body mass index. When the well-being scores for each of the clusters were compared with normative data, it was clear that the well-being status for participants in two of the clusters ("the unhappy employee" and "the unhappy with work employee") was a cause for concern. Indeed, low levels of well-being have been associated with a range of maladaptive consequences, such as higher levels of anxiety

(Greenberg et al., 1999), stress (Berger, 1994), and performance at work (Judge & Bono, 2001). Although the largest percentage of the sample could be characterised as having adequate levels of well-being, taken together, the "unhappy employees" and "the unhappy at work employees" accounted for 32.70% of the whole population. Therefore, nearly one third of the sample would clearly benefit from any efforts designed to enhance their levels of well-being. Only future research which adopts randomised controlled designs would tell whether any workplace exercise intervention would be effective in enhancing the well-being of these employees.

There were some similarities between the clusters derived in the present study and those described in Study 2, but they differed in that physical activity groups could not be included in the cluster analysis in the present study. Therefore, no direct replication could be made, but well-being profiles between the clusters in the different studies were relatively similar. However, the distribution of the different physical activity groups into the four clusters was not statistically different. Nonetheless, it was noteworthy that out of the four cluster groups, the cluster with the highest percentage of inactive employees was "the unhappy employee". Despite the lack of statistical significance, this provides a slight indication that it may be beneficial for any workplace intervention to target this group specifically. However, the process of identifying this group of employees is all the more difficult in light of the finding that there was a relatively equal distribution of males and females, and secretarial and administrative employees in each cluster group.

It was interesting to find, however, that the physical activity groups differed significantly in physical and work-related well-being. Not only did the physically active groups differ significantly from the inactive group, it was also shown that the exercise/sport group had significantly higher levels of physical well-being compared to the active living group. The findings therefore clearly supported the second hypothesis of this study. In terms of work-related well-being, the results showed that a combination of active living activities and sport or exercise activities was associated with a significantly lower level of fatigue, and a significantly higher level of enthusiasm at work than those only engaging in active living activities. The findings goes somewhat in contrast with a recent review by Biddle and Mutrie (2001) which indicated that moderate intensity activity may be enough to enhance psychological well-being. However, given the cross-sectional nature of the present study, much more research is

needed to test the present findings using longitudinal or experimental research designs. Clearly, the question has major implications for how physical activity should be promoted in workplace settings.

Hypothesis three suggested that the regulation underlying exercise behaviour may account for any differences existing between the physically active groups. Indeed, the results supported this hypothesis, as differences in physical- and work-related well-being became non-significant when controlling for self-determination to exercise. Despite the cross-sectional design of the present study, this finding appears to support SDT predicting that, to the extent that behaviours enhance a sense of autonomy in the individual, it will lead to well-being (Ryan & Deci, 2000). It is therefore possible that the regulation underlying the exercise behaviour is at least as important for more domain-specific well-being as performing the behaviour in the first place.

The fourth hypothesis was supported by the finding that self-determined types of exercise regulation predicted most well-being variables in a positive direction. Specifically, intrinsic motivation was the most consistent predictor of well-being. It is important here to note, that although self-determined exercise motivation predicted scores on well-being statistically, this does not necessarily mean that the relationships are causal. However, the findings do appear to support Maltby and Day's (2001) findings that intrinsic motivation to exercise was significantly associated with more positive well-being, including self-esteem, a global indicator of well-being. The fact that intrinsic motivation predicted self-esteem supports Fox's (1997) reasoning that exercise behaviours that are autonomously regulated are compatible with the individual's identity, and may therefore work to enhance- as well as confirm the self. In turn, these are pre-requisites for high levels of self-esteem.

The results also indicated that identified exercise regulation significantly predicted physical well-being. As identified regulation is considered a self-determined type of extrinsic motivation (Ryan & Deci, 2000), this is also consistent with the fourth hypothesis. In other words, individuals may not have to feel that the physical activity they engage in is fun and enjoyable but just that it is of personal importance to them in order to feel good about the physical aspects of themselves. Given the documented positive relationships between physical self-worth and affective states (Sonstroem &

Potts, 1996; Van de Vliet et al., 2002), including enthusiasm at work (see Study 1), efforts to enhance physical well-being should be worthwhile, also in a work context.

There was also some evidence suggesting that intrinsic motivation was associated with life satisfaction to a moderate degree. To my knowledge no prior studies have examined the potential of exercise motivation in predicting life satisfaction, and this finding is therefore intriguing. The finding could be seen in the light of the perceptions of control that individuals may experience when engaging in autonomously regulated behaviours. In this context, it is also noteworthy that one of the participants in the previous study (see "Allan" Study 3) stated that one of the reasons why exercising may have an influence on life satisfaction is due to the higher degree of control he felt regarding his personal life compared to his job situation. Hence, it is possible that the regulation underlying the exercise behaviour is more strongly related to those aspects of life which are perceived to be more controllable. However, it is important to keep in mind the possibility that intrinsic motivation may be a general characteristic that is applied to most behaviours that any given individual engage in. This should be tested in future research.

The above suggestion may partly explain why intrinsic motivation to exercise predicted job satisfaction and perceptions of job competence less strongly than global well-being. In fact, the variance explained by exercise motivation in job satisfaction and perceptions of job competence was very small. The suggestion is somewhat in contrast to the second part of the fourth hypothesis stating that exercise regulation would predict more distal links less strongly compared with specific ones. In addition, contrary to expectations, exercise motivation only predicted two (enthusiasm and fatigue at work) out of four indicators of affective states at work. Possibly the fact that no discrimination was made between exercising outside of the working day and exercising during the working day (e.g. during lunchtime) may have underestimated the value of the prediction. This is because it would be expected that exercise and its associated regulation might only be related to work-related well-being for those exercising before or during work. Future research should aim to test this suggestion in more detail.

In contrast to autonomous regulations, introjected exercise regulation significantly predicted well-being in a negative direction, which is also supportive of the fourth

hypothesis, and previous research examining the relationship between exercise regulation and well-being (Maltby & Day, 2001). Interestingly, however, external regulation to exercise was not as significant a predictor of well-being as introjected regulation. This finding is puzzling, but may indicate that internally controlled behaviours have more detrimental effects on well-being compared to feeling controlled by external sources. This suggestion has not been addressed so far, but would be interesting to examine in future research.

There are several limitations to the present study. First of all, as mentioned above, it is not possible to infer that different types of exercise motivation *cause* well-being due to the cross-sectional nature of this design. Again, future research should adopt longitudinal research designs, particularly in the light of the paucity of research that has examined the relationships between exercise regulation and well-being. Another potential limitation of the present study is that the amount of participants in the inactive group may have been underestimated. Indeed, previous research has shown that sedentary adults often overestimate the intensity of their physical activity, especially with regard to moderate physical activity (Duncan, Sydeman, Perri, Limacher, & Martin, 2001). Finally, the issue of whether an exercise motivation scale accurately captures physical activity regulation for those participants who only engage in active living activities remains to be explored.

In conclusion, the results showed that distinct typologies existed in the present study. Although the well-being profiles were similar to those in Study 2, the results showed that no significant differences existed in membership to physical activity groups that were operationalised as overall types of physical activity. In support of results from Study 1, it was also shown that those doing either regular sport/exercise or a combination of sport/exercise and active living activities were significantly better off in terms of physical well-being and fatigue and enthusiasm at work. In addition, the present study provided some generalisation to the suggestion that exercise motivation, conceptualised and operationalised according to OIT significantly predicted, and was significantly related, to elements of well-being for University secretarial and administrative employees. These findings build on previous suggestions (e.g. Fox,

1999) that the *process* of exercising or engaging in physical activity may be important for understanding the relationship between physical activity and mental well-being.

General comments

One of the key questions in the present study was directed towards finding out whether physically active individuals differed significantly from an inactive group in indicators of well-being. Indeed, results confirmed that, compared to those involved in regular exercise and/or sport activities, this group had significantly lower levels of well-being. For this reason alone, it would be interesting to study them separately. However, one of the major reasons why they are a particularly important group to examine is an interest in actively targeting these individuals for physical activity interventions, because they may be more "at risk" of developing ill health.

However, there are likely to be considerable differences in well-being among those who are inactive, because as suggested by earlier findings in this thesis (see Study 2), the relationship between physical activity and well-being seem to be multi-dimensional. It would therefore be useful to establish well-being typologies separately for this sub-population. Another major consideration is the extent to which inactive individuals are likely to start to engage in physical activity or exercise, because intervention strategies which are targeted at those who are more motivated to change this behaviour are likely to be more effective. To this end, the construct of amotivation to exercise may be useful, because it is shown to relate negatively to intention to take part in exercise (Standage, Duda, & Ntoumanis, in press). Indeed, it is noteworthy that there is a lack of research on amotivation to exercise. Coupled with an analysis of well-being and amotivation to exercise, the following study aimed to assess the needs of these employees with regard to exercise and modular-type programmes in a new Sport, Exercise and Health Centre at their own workplace (i.e. the University) which is due to open in October 2002. This would provide these individuals with a sense of choice and increase the likelihood of delivering more cost-effective workplace interventions in the future.

CHAPTER SEVEN

STUDY FIVE: AN IDENTIFICATION OF WELL-BEING AND EXERCISE AMOTIVATION TYPOLOGIES AMONG A SAMPLE OF PHYSICALLY INACTIVE UNIVERSITY EMPLOYEES

When examining the financial impact, and thus effectiveness, of any employee exercise programme, Shephard (1996a) stated that the benefit is attenuated by four main factors, of which two are of immediate relevance here. One is the prevalence of need for such programmes among the employees, which is also referred to as susceptibility. In other words, Shephard (1996a) argues that it is only that fraction of employees who are physically inactive and who decide to participate in programmes that will achieve any benefits from them. While this argument is debatable (others are likely to benefit too in different ways), it certainly makes intuitive sense that these individuals have more scope for development in terms of gaining physical and psychological benefits from physical activity than those who are already physically active. The second factor is the likelihood that those "in need" of the programmes will actually participate in them. In fact, one of the recurring problems for those implementing the programmes is that it is only those employees who are already physically active that choose to take part in the programmes, whereas those who need it more, i.e. the physically inactive employees, stay away (Shephard, 1999). Naturally, this diminishes the potential positive effects of such programmes. It is likely that one of the reasons for this is that the types of programmes on offer do not appeal to those who are physically inactive and consider themselves unfit. It is therefore important for the corporation, as well as for the employees "in need", that efforts are made to design programmes that attract these employees.

It could be inferred from the above that many corporations have not been successful at targeting high risk groups. As stated in Chapter 2, in the process of targeting populations "in need", the first step is to identify those individuals among a larger population group, then analyse the feelings and behaviours of that population to know more about them. Based on this information, corporate exercise professionals may subsequently begin to plan, execute, and evaluate employee exercise programmes. The problem seems to be that these analyses are not often carried out. Stated differently, "at risk" profiles and needs of the employees have not been taken into account when implementing such programmes.

In the area of health promotion, it is generally acknowledged that there are very few work-sites that have specifically targeted high risk groups (e.g. Campbell et al., 2000). One exception was a recent study by Campbell et al. (2000) who examined behaviour change priorities among a sample of relatively inactive blue-collar women

who participated in a worksite health promotion study. Based on the assumption that behavioural risk factors cluster together, they used a multi-behavioural approach to behaviour change in that they presented the employees with options for different behaviour change programmes such as exercising, diet, and smoking cessation (Campbell et al., 2000). The authors suggested that this type of information provided by high risk groups could assist in the targeting of health education efforts to reach these groups. In addition, Emmons et al. (1994) have suggested that success in changing one behaviour may enhance self-efficacy and motivate the individual to aim to change other health-related behaviours. Finally, Shephard (1999) suggested that work-sites should implement not only exercise classes, but also advice on other aspects of individual health (e.g. nutrition and stress management) as they appear to be more effective in promoting adherence among programme participants. Therefore, although the main focus of the present chapter is to identify well-being typologies of inactive University employees, it may be very beneficial to gather secondary information on their priorities and needs for modular-type programmes, as well as exercise programmes, at the workplace. The establishment of a new sport, exercise and health centre at the University of Bristol offers an ideal opportunity to assess the health and well-being needs of a distinct group of inactive employees before the centre is completed. The information may subsequently be used to design well-being interventions that target the physically inactive employee with low levels of well-being. Indeed, it is predicted that those with initially low levels of mental well-being have the greatest to gain from such programmes. For example, research into the effect of physical activity on self-perceptions has shown that the effect is greater for those individuals with initial low levels of self-esteem (Fox, 2000).

Although worksite programme may attract and subsequently possibly recruit inactive and unhappy employees for tailored exercise or physical activity interventions, the second major challenge is to sustain adherence in the group. Indeed, research has shown that approximately fifty percent of recruits to programmes become non-compliant within a few months (Leatt et al., 1988). Examining predictors of persistence are therefore warranted. To this end, the concept of exercise amotivation may be useful. Indeed, amotivation as a general construct has been shown to be negatively associated with persistence over a twenty-two month period (Pelletier, Fortier, Vallerand, &

Briere, 2002). Specifically, amotivation refers to situations in which there is a lack of either extrinsic or intrinsic motivation towards a specified behaviour. Amotivation may be evident in situations in which individuals perform a behaviour not out of choice but out of necessity (e.g. in PE; Ntoumanis, Pensgaard, Martin, & Pipe, 2002), or when there is a lack of a behaviour, as in the case of the present study.

As described previously (see Chapter 2) the concept of amotivation is included in Self-Determination Theory (SDT). Specifically, Deci and Ryan (2000) have argued that amotivation stems from a lack of basic need satisfaction, and according to self-determination theory, amotivation mediates the relationship between thwarted need satisfaction and various negative outcomes. Amotivation is manifested when individuals do not perceive contingencies between their behaviors and subsequent outcomes (Seligman, 1975), do not value the activity (Ryan, 1995), or feel incompetent towards a given activity (Deci, 1975). The concept of amotivation is akin to learned helplessness suggested by Abramson, Seligman, and Teasdale (1978). Learned helplessness indicates feelings of uncontrollability which can be specific or global, unstable or stable, and universal or personal. According to Abramson et al. (1978), global, stable and personal helplessness beliefs are likely to lead to negative mental health such as depression and low self-esteem.

Amotivation has been proposed as a multi-dimensional construct. Specifically, extending Abramson et al.'s (1978) work, Pelletier, Dion, Tuson, and Green-Demers (1999) proposed a model of amotivation toward environmental protective behaviors. They argued that helplessness beliefs, the global form of amotivation, stemmed directly from strategy beliefs and capacity beliefs, and indirectly from effort beliefs. Strategy beliefs are similar to the notion of outcome expectancy (Bandura, 1997) and refer to the individual's expectations of the effectiveness of certain strategies in producing desired outcomes. In turn, capacity beliefs are similar to the concept of self-efficacy (Bandura, 1997) and refer to the individual's belief in his or her ability to produce a desired outcome. Finally, although some people may acknowledge that a behaviour may produce some desired outcome and believe that they can successfully carry out the behaviour, they may not be prepared to invest the effort which engaging in the behaviour involves.

Intention to engage in exercise or physical activity may be another important construct in identifying employees who may end up taking part in exercise or physical activity programmes in the new Centre for Sport, Exercise and Health. Indeed, intention to engage in exercise or physical activity may predict future exercise behaviour (Papaioannou, 2000). Amotivation, in turn, may be linked negatively to intentions to engage in physical activity in the future. Indeed, Ryan and Deci (2000) have argued that people who are amotivated toward some activity, lack the intention to act. In the context of physical education, a recent study employing SEM found that amotivation related negatively to intentions to engage in physical activity during leisure-time (Standage et al., in press).

In view of the above, the aim of this study was to identify typologies of inactive employees with different levels of global amotivation to exercise beliefs (i.e. helplessness beliefs) and levels of well-being with the view that the information may prove important in targeting inactive and unhappy University employees for exercise and wellness interventions in the workplace. The validity of the cluster solution was subsequently examined on negative affective states at work, and groups were compared on more specific types of exercise amotivation beliefs (i.e. capacity, effort, and strategy beliefs). Coupled with this was an analysis of needs or priorities for modular type programmes among the cluster groups which may further an understanding of how to reach "at risk" groups. Finally, it was examined whether the cluster groups differed significantly on intention to engage in structured exercise or sport and/or intention to engage in active commuting (walking or cycling) to work within the next six months.

Because of the lack of research examining well-being and amotivation typologies of inactive employees, no direct hypothesis was made regarding the number of cluster groups. However, given the multi-dimensional relationships between physical activity and mental well-being (see Study 2), it was expected that at least one cluster would emerge as being high or moderate on well-being components, and one or more would have low levels of well-being on a minimum of one of the well-being components. In addition, it was expected that the clusters would differ significantly on negative affect at work. With regard to amotivation to exercise and priorities for modular-type programmes, no predictions were made.

METHODS

Participants

Only those participants who were classified as physically inactive in the sample described fully in Study 4 were selected for the present study. Recall that physical inactivity was defined as engaging in less than one session per week of active living activities (i.e. walking or cycling) or exercise and sport lasting minimum fifteen minutes per session. The mean age of the participants in the present study was 46.00 (*SD* = 10.39), and the mean age was significantly different from those classified as exercisers (*M* age = 43.03; *SD* = 11.54) (t (748) = -2.31; p = .02). The present sample was therefore significantly older than those classified as exercisers. With a mean Body Mass Index (BMI) of 25.03 (*SD* = 4.83), a significant difference also existed between participants in this study and the overall exercising group from Study 4 (*M* BMI = 23.95; *SD* = 4.14) (*t* (745) = -2.34; p = .02). Hence, although participants in the present study cannot be classified as overweight or obese, they were significantly heavier for their height compared to the exercisers. Table 7.1 presents some additional descriptive data on the two groups.

Table 7.1. Descriptions of the physically inactive employees and the exercising groups from Study 4

	Physically inactive		Exercisers	
	n	%	*n*	%
Males	12	16.22	148	21.23
Females	62	83.78	549	78.77
Secretarial	31	41.89	243	35.12
Administrative	43	58.11	449	64.88

Pearson chi-square analyses showed that no differences existed in gender distribution between the physically inactive group and the exercising groups from Study 4 ($\chi^2(1) = .40$; $p = .53$). In contrast, a significant difference existed between the two groups on job role distribution ($\chi^2(1) = 4.84$; $p = .03$). Specifically, there was a significantly higher proportion of secretaries in the physically inactive group compared to the physically active groups from Study 4.

Instruments

Most of the questionnaires which were used for the present chapter were identical to those used in studies 1, 2 and 4. Specifically, these were the Satisfaction With Life Scale (SWLS), the global self-worth and perceptions of job competence scales from the Adult Self-Perception Profile (ASPP), job satisfaction, the Job Affect Scale (JAS), physical self-worth from the Physical Self-Perception Profile (PSPP), and the physical satisfaction scale. However, an additional amotivation to exercise scale was used for the purposes of the present chapter.

Amotivation to exercise

An amotivation scale by Pelletier et al. (1999) was used as a basis for developing a scale that related specifically to exercise. Pelletier et al. (1999) developed the Amotivation Toward the Environment Scale (AMTES) which aimed to measure multi-dimensional amotivation toward carrying out environmentally friendly behaviours. The scale includes four components: Amotivation due to helplessness beliefs, strategy beliefs, capacity beliefs, and effort beliefs. The scale consists of sixteen items, four for each sub-scale. Participants are asked why they are not doing things for the environment, and their responses are scored based on a Likert scale ranging from 1 (="does not correspond at all") to 7 (="corresponds exactly"). Pelletier et al. (1999) tested the validity of the scale using CFA. With regard to the construct validity of the scale, they found support for the hypothesised four-factor model using two independent samples. In addition, the convergent validity of the scale was examined by correlating the amotivation sub-scales with constructs which should be linked conceptually to the elements of amotivation (e.g. autonomous motivation and perceived competence for environmental behaviours). Their findings showed that the four types of amotivation were significantly correlated with the relevant constructs, and hence supported the convergent validity of the scale (Pelletier et al., 1999). Finally, the results indicated acceptable internal consistency of each of the sub-scales (Pelletier et al., 1999).

The scale was modified for the purpose of the present study. The AMTES scale was chosen as no amotivation scale existed which has examined amotivation to exercise as a multi-dimensional construct. Specifically, the modified scale examined amotivation to exercise due to helplessness beliefs, strategy beliefs, effort beliefs, and capacity

beliefs. For the sake of brevity, however, it was decided to include only two, and not four, items per sub-scale. Example items from each of the modified sub-scales included "What little exercise I could do would not have any impact on my general state of health" (helplessness), "I don't think that taking part in an exercise programme is really going to improve my general state of health" (strategy), "I just can't seem to make the effort to change my exercise habits" (effort), and "I don't feel I have the competence to start exercising" (capacity).

Procedures

The procedure was similar to that of the previous chapter, as the selection of participants for the present study was based on responses to the survey in Study 4. Specifically, those participants who were classified as physically inactive were subjected to further analyses as a separate sub-sample. In addition, prior to carrying out the survey with the employees at the University, debates were initiated with senior staff responsible for the new Centre for Sport, Exercise, and Health at the University regarding the nature of possibilities for modular-type and exercise programmes that could potentially be implemented. Based on these discussions, a list of programmes was developed (see Appendix 7).

RESULTS

Preliminary analyses

As recalled from the methods section (see "Instruments"), the amotivation to exercise scale was assumed to consist of four different sub-scales. Amotivation due to helplessness beliefs was included as a separate variable in the cluster analysis (as it was a more global measure of amotivation), and the reliability of the scale as a whole was therefore not examined. In addition, the reliability of the sub-scales of the amotivation to exercise instrument was not examined using alpha reliability coefficients because each of the subscales consisted of only two items. Instead, correlation coefficients were calculated for each subscale. The results of the bivariate correlation analyses are shown in Table 7.2.

Table 7.2. Correlation co-efficients among items from each subscale in the amotivation to exercise scale

	2	3	4	5	6	7	8
1. Helplessness 1	.46**	.36**	.44**	.02	.34**	.35**	.35**
2. Helplessness 2		.28*	.36**	.37**	.47**	.30*	.64**
3. Strategy 1			.35**	.06	.05	.12	.17
4. Strategy 2				.09	.21	.60**	.33*
5. Effort 1					.63**	.21	.56**
6. Effort 2						.34**	.74**
7. Capacity 1							.54**
8. Capacity 2							

Table 7.2 shows that the items representing amotivation due to helplessness beliefs were significantly correlated at $r = .46$. The items representing amotivation due to strategy beliefs were significantly associated at $r = .35$. Effort beliefs were also significantly correlated at $r = .63$. Finally, items signifying capacity beliefs were significantly correlated at $r = .54$. The significant and moderate correlations between the items for each sub-scale provide some evidence as to the existence of the four sub-scales. It should be noted, however, that some of the items from different subscales also correlated significantly to a moderate degree (e.g. $r = .74$ between "effort 2", and "capacity 2"). This could imply that the discriminant validity of the scale is not very strong.

No exploratory factor analysis was performed on any of the amotivation sub-scales, as a minimum of three variables per factor are recommended for carrying out this analysis (Kim & Mueller, 1978).

Cluster analysis

Hierarchical cluster analysis was adopted to examine well-being typologies of physically inactive employees based on amotivation to exercise due to helplessness beliefs as well as positive well-being indicators. Once again, Ward's hierarchical method was used and the agglomeration schedule coefficients were inspected to identify the number of clusters present. The results indicated that there was a large increase in the coefficients from a one- to a two-cluster solution, and it was therefore determined

that the data could best be classified as two clusters (see Figure 7.1). In addition, the unstandardised means and standard deviations used to create the cluster solution are presented in Table 7.3.

Figure 7.1. Clusters on well-being and amotivation to exercise due to helplessness beliefs (all scores are standardised)

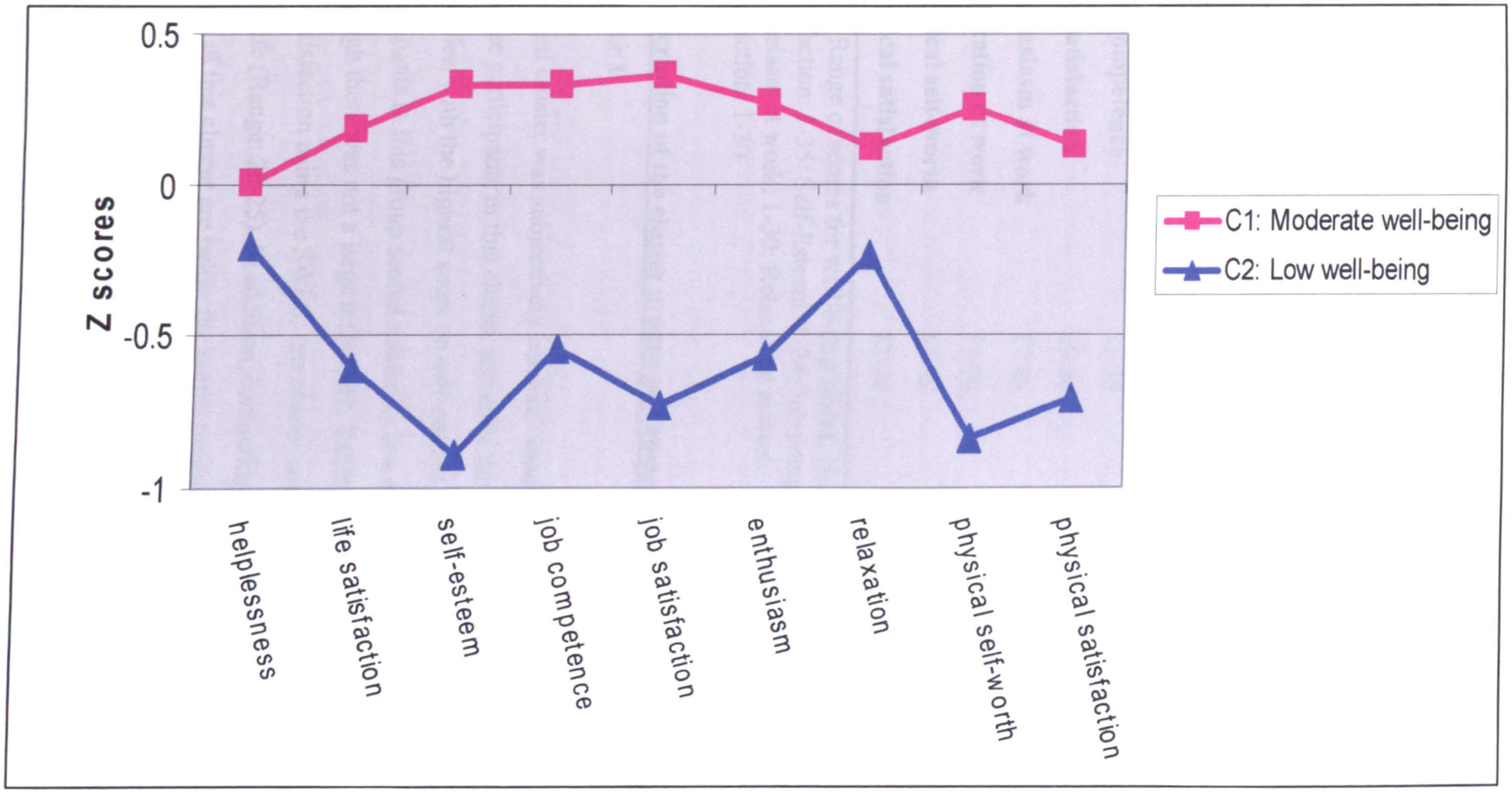


Table 7.3. Means (M) and Standard Deviations (SD) of the variables used for each cluster

	C1: Moderate well-being		C2: Low well-being	
	M	*SD*	*M*	*SD*
Amotivation due to helplessness beliefs	5.86	2.88	5.22	3.12
Life satisfaction	23.04	6.45	17.96	5.70
Self-esteem	18.56	2.79	14.16	3.36
Job competence	12.98	1.79	11.16	2.19
Job satisfaction	39.20	8.04	28.22	9.29
Enthusiasm at work	17.96	3.46	13.96	4.03
Relaxation at work	11.06	2.76	10.08	2.91
Physical self-worth	13.72	2.77	10.04	2.53
Physical satisfaction	11.74	3.08	8.74	2.98

Note. Range of scores for well-being scales: Helplessness beliefs: 1-14; Life Satisfaction: 1-35; Self-Esteem: 1-24; Job competence: 1-16; Job Satisfaction: 1-50; Enthusiasm at work: 1-30; Relaxation at work: 1-20; Physical self-worth: 1-24; Physical satisfaction: 1-30

A description of the cluster groups and comparison with established norms

Cluster 1

The first cluster was subjectively labelled "moderate well-being" (n = 44; 59.46%), because participants in this cluster scored in the middle range on all well-being variables, with the highest score on self-esteem. Compared to the second cluster, participants in this group scored relatively low on levels of amotivation to exercise, although there was not a large difference. Taking into consideration normative data on life satisfaction using the SWLS, this cluster could be classified as "slightly satisfied" with life (Range: 20-25). In addition, comparing their self-esteem levels with norms, the scores of this cluster are below the norms produced by Messer and Harter (1986) on full-time working men and women (Range: 19.86-20.40). Comparing perception of job competence scores with the same sample (Range: 14.24-14.44; Messer & Harter, 1986), this cluster also felt somewhat less competent at their jobs. Interestingly, their levels of job satisfaction, however, were higher than data produced by Judge et al. on three

different employee samples (Range: 34.45-37.70; Judge et al., 1998). Possibly due to their high levels of job satisfaction, this cluster also felt very enthusiastic at work, as well as relatively relaxed, as they scored above the mid-points of the scales on both sub-scales. It is also interesting to note that, although their levels of physical self-worth were relatively high compared to the other cluster group, it was several points lower compared to findings from a previous study using a general adult population (M = 16.89; Sonstroem et al., 1992). In fact, their level of physical self-worth was only slightly higher than norms produced by Fox (1990) on obese males and females (Range: 10.60-13.40). In line with this finding, scores on physical satisfaction were rather below the mid-point of the scale.

Cluster 2

The second cluster was called "low well-being" (n = 30; 40.54%), because, relative to the first cluster, the participants had low scores on the well-being variables. It is very significant to note that, when compared to existing normative data, levels of well-being were very low across the range of variables. Specifically, this group of employees could be characterised as being "slightly dissatisfied" with life (Pavot & Diener, 1993), and felt very unhappy about themselves as a person compared to norms produced by Messer and Harter (1986; Range: 19.86-20.40) on full-time working women. The cluster members also had low levels of work-related well-being, with perceptions of job competence and levels of job satisfaction being well below existing norms (Messer & Harter, 1986; Judge et al., 1998). In addition, feelings of enthusiasm while at work were low, in fact they were well below the mid-point of the scale, and four points below the "moderate well-being" cluster. As may have been expected, members of this cluster also felt very unhappy about the physical aspects of themselves. Indeed, their levels of physical self-worth were somewhat lower than norms produced by Fox (1990) based on obese populations. Finally, compared to cluster 1, levels of exercise amotivation due to helplessness beliefs was slightly lower in this cluster group, but not markedly.

Cluster description on gender, age, body mass index, and job role profiles

The number and percentage distribution of each gender in the clusters are presented in Table 7.4.

Table 7.4. Gender distribution in each cluster

	Males		Females	
	n	%	*n*	%
C1: Moderate well-being	10	22.7	34	77.3
C2: Low well-being	5	16.67	25	83.33

Table 7.4 shows that there was a high representation of females in both cluster groups. To examine whether there were any significant differences on gender between the two cluster groups, a chi-square analysis was carried out. The analysis revealed that there were no significant differences between the two cluster groups on gender distribution (χ^2 (1) = 1.67; p=.196).

In addition, the age and BMI distribution in each cluster group was compared. The results are shown in Table 7.5.

Table 7.5. Age and body mass index (BMI) distribution in each cluster

	Age		BMI	
	M	***SD***	***M***	***SD***
C1: Moderate well-being	46	11	25.45	5.13
C2: Low well-being	47	10	25.68	5.28

As shown in Table 7.5, age and BMI was relatively similar in the two cluster groups, although members of the "low well-being" cluster were generally one year older than members of the "moderate well-being" cluster. However, an independent samples t-test analysis showed that there were no significant differences between the two cluster groups on each of the variables (age: t (69) = -.398; p = .692 and BMI: t (70) = -.185; p = .854).

Job role profiles (secretarial and administrative) between the clusters were also compared. Table 7.6 presents the distribution between the cluster groups.

Table 7.6. Job role distribution in each cluster

	Secretarial		Administrative	
	n	%	*n*	%
C1: Moderate well-being	16	36.4	28	63.6
C2: Low well-being	16	53.33	14	46.67

Table 7.6 shows that the secretarial to administrative ratio was different between the two clusters. Specifically, there was a slightly higher percentage of secretarial employees in the "low well-being" cluster, whereas in the "moderate well-being" group, a greater number of administrative employees was evident. However, a Pearson chi-square analysis revealed that there was no significant differences between the cluster groups on job role ditribution (χ^2 (1) = 1.309; p = .253).

Validation of cluster solution

As in Studies 2 and 4, the cluster solution was statistically validated through a MANOVA on the variables of nervousness and fatigue at work. The MANOVA was significant. (Pillai's criterion = .194; F (2, 70) = 8.42; p < 0.01). The mean differences on nervousness and fatigue of the two groups are presented in Table 7.7.

Table 7.7. Mean differences of cluster groups on nervousness and fatigue at work

Cluster groups	Nervousness at work		Fatigue at work	
	M	*SD*	*M*	*SD*
C1: Moderate well-being	8.92	.52	6.58	.38
C2: Low well-being	10.88	.72	9.16	.53
	F	***p***	***F***	***p***
	4.90	.03	15.59	.00

Table 7.7 shows that the significant difference between the two cluster groups was on both nervousness and fatigue at work. Specifically, participants in the "low well-being" cluster were significantly more fatigued during the week of replying to the questionnaire compared to participants in the "moderate well-being" cluster. These results provide some support to the validity of the cluster solution.

Sources of amotivation to exercise

Table 7.8 presents the means and standard deviations in the specific amotivation beliefs (i.e. amotivation to exercise due to strategy, effort, and capacity beliefs) for the two cluster groups.

Table 7.8. Means (M) and Standard Deviations (SD) in amotivation to exercise due to strategy, effort, and capacity beliefs

	C1: Moderate well-being		C2: Low well-being	
	M	***SD***	***M***	***SD***
Amotivation due to strategy beliefs	5.22	3.00	5.21	2.86
Amotivation due to effort beliefs	8.59	3.69	9.53	3.26
Amotivation due to capacity beliefs	5.91	3.29	7.13	3.18

To examine the differences in specific amotivation beliefs between the two cluster groups, a MANOVA was carried out. However, the MANOVA was not significant: (Pillai's criterion = .021; F (3, 70) = .506; $p > 0.05$). This would be expected, as the cluster solution demonstrated that the cluster groups did not vary greatly on the global measure of amotivation due to helplessness beliefs.

Intention to exercise or to engage in active commuting to work

Participants were asked whether they were intending to start exercising regularly (i.e. at least once per week for at least 15 minutes duration per session) either on their own or as a part of structured exercise classes or engage in active commuting to work (walking or cycling at least once per week for at least 15 minutes duration per session) within the next six months. Table 7.9 presents the results.

Table 7.9. Distribution of intention to exercise or actively commute to work regularly within the next six months in each cluster

Cluster groups	Intention to exercise		Intention to actively commute to work	
	n	%	*n*	%
C1: Moderate well-being	25	56.8	5	11.4
C2: Low well-being	21	70	5	16.67

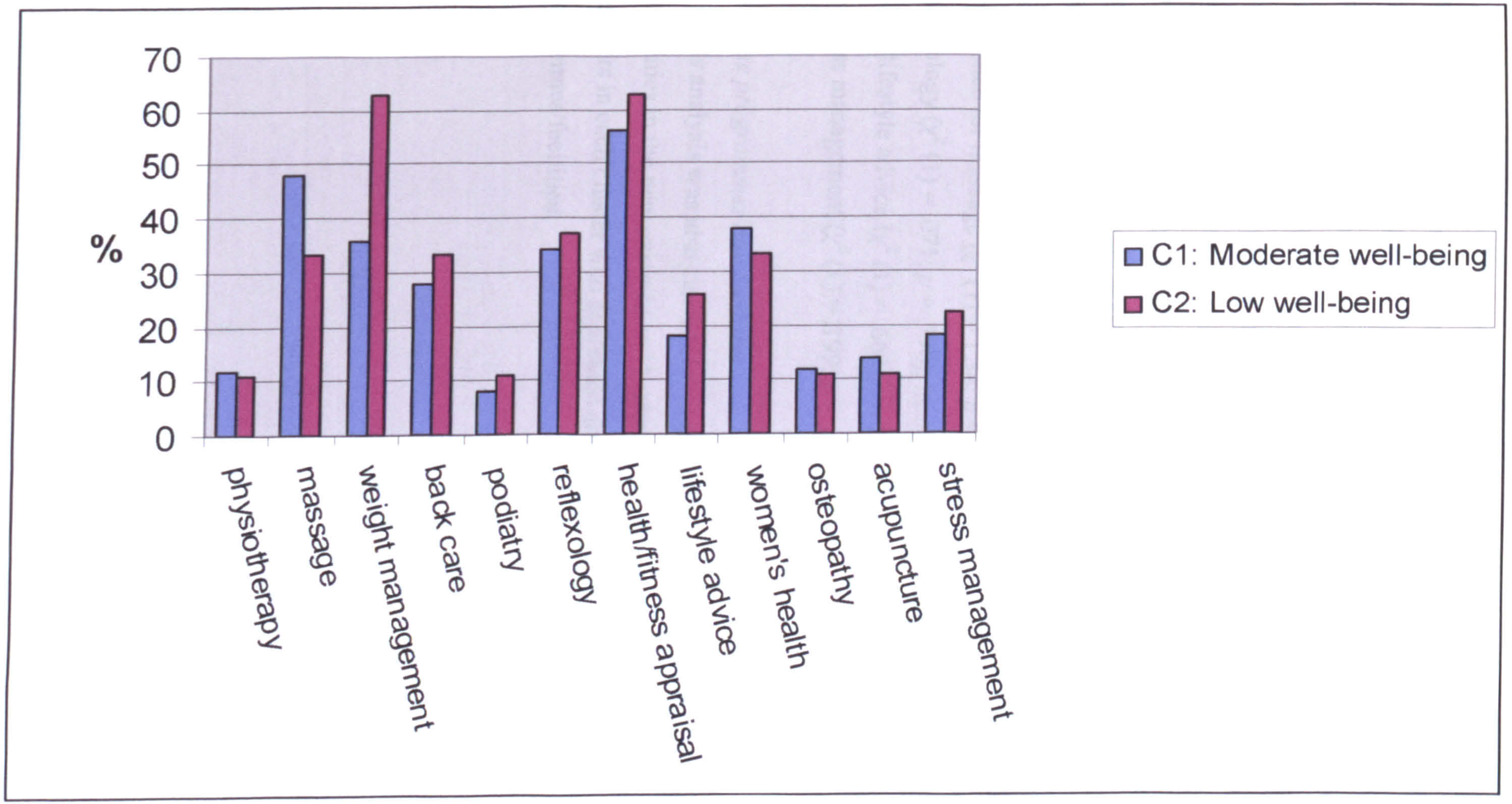
Table 7.9 shows that a relatively high percentage of both cluster groups (notably the "low well-being" cluster) intended to start exercising within the next six months. Pearson chi-square analyses revealed that there were no significant differences between the two clusters on intention to engage in structured exercise or sports within the next six months (χ^2 (1) =1.067; p=.302) or on intention to engage in active commuting to work (χ^2 (1) =.353; p=.552).

Needs analysis

Modular programmes

Figure 7.2 presents the percentage of members in each cluster group who showed an interest in the modular programmes which may be established at the new Sport, Exercise, and Health Centre at the University of Bristol.

Figure 7.2. Percentages of participants in each cluster group who expressed interest in modular programmes

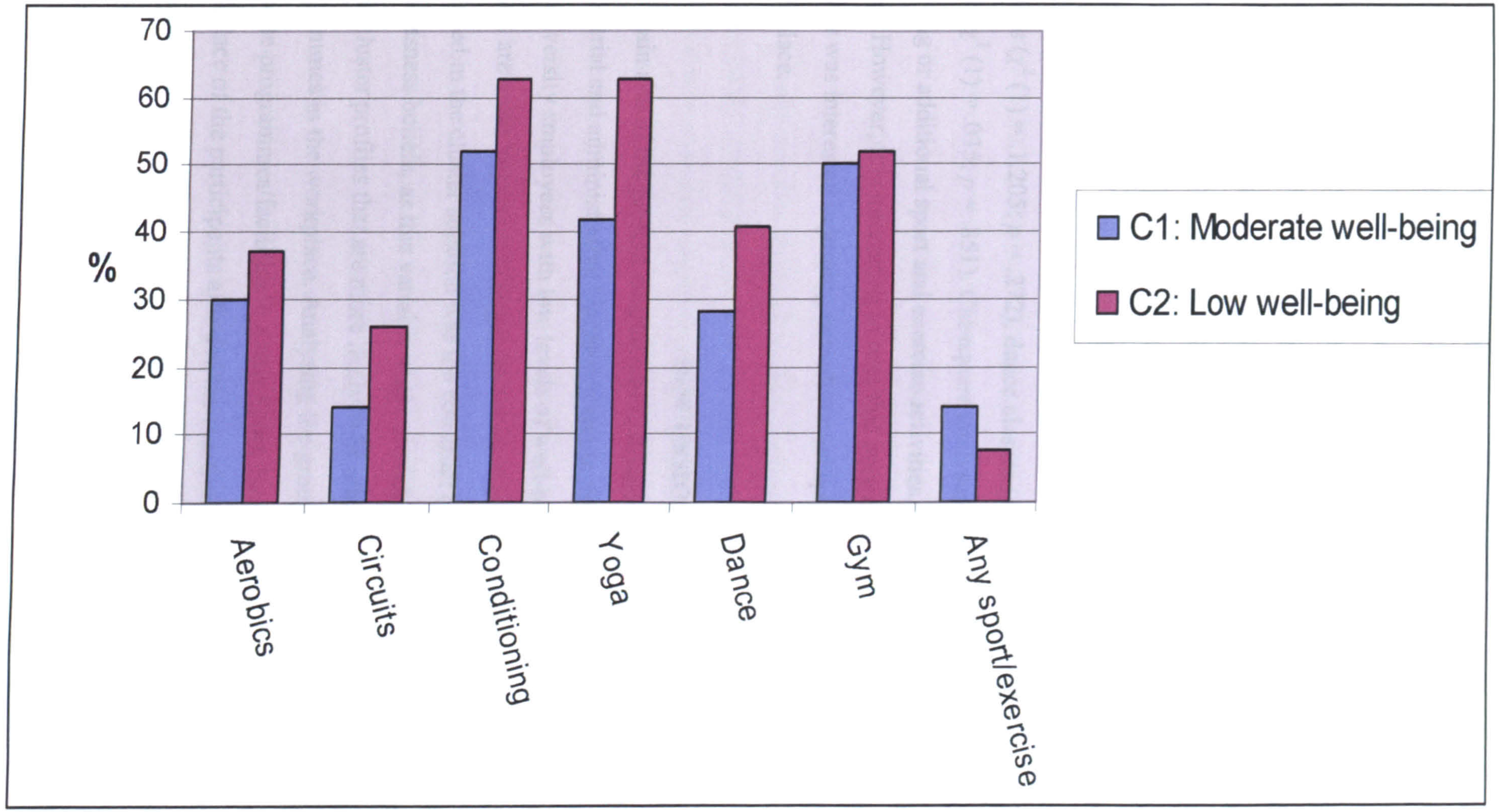


Interestingly, as may be seen in Figure 7.2, the percentage of members in the "low well-being" cluster showed a higher interest for a few of the modular programmes, in particular weight management, but also for example for lifestyle advice, back care, and health and fitness appraisal compared to members of the "moderate well-being" cluster. In order to examine whether any significant differences existed between the two clusters on preference for any of the modular type programmes, Pearson chi-square analyses were carried out. However, it is only advisable to carry out chi-square analyses for cells which have a minimum of five cases as analyses with less than five cases may be inappropriate (Ntoumanis, 2001). Therefore, analyses were only carried out for eight of these programmes. The cluster groups only differed significantly on preference for weight management (χ^2 (1) = 5.14; p = .023). The clusters did not differ significantly on preference for massage (χ^2 (1) = 1.54; p = .215), back care (χ^2 (1) = .24; p = .626), reflexology (χ^2 (1) = .071; p = .790), health and fitness appraisal (χ^2 (1) = .350; p = .554), lifestyle advice (χ^2 (1) = .669; p = .413), women's health (χ^2 (1) = .165; p = .685) or stress management (χ^2 (1) = .199; p = .655).

Exercise programmes and facilities

A needs analysis was also carried out on priorities for exercise and sports programmes or facilities in the new exercise and health centre. Figure 7.3 presents the percentage of members in each cluster who expressed an interest in seven different exercise or sport programmes/facilities.

Figure 7.3. Percentages of participants in each cluster group who expressed interest in exercise or sports programmes/facilities



The immediate impression of the results from Figure 7.3 is that the "low well-being" cluster expressed higher interest in most of the programmes compared to the "moderate well-being" cluster. The only exception was additional sport or exercise activities. Pearson chi-square analyses were carried out to test whether any significant differences existed in interest in the different exercise or sport programmes/facilities between the two clusters. Results revealed that the cluster groups only differed significantly on interest in yoga classes (χ^2 (1) = 4.243; p = .039), with a significantly higher percentage of participants in the "low well-being" cluster showing an interest compared to members in the "moderate well-being" cluster. The clusters did not differ significantly in interest for aerobics classes (χ^2 (1) = .128; p = .721), conditioning classes (χ^2 (1) = .1.205; p = .272), dance classes (χ^2 (1) = 3.156; p = .076), or joining a gym (χ^2 (1) = .035; p = .851). Chi-square analyses were not carried out for circuit training or additional sport and exercise activities, because one cell had less than five cases. However, it is interesting to note that only one participant in the "low well-being" cluster was interested in joining any additional sport or exercise programmes at the workplace.

DISCUSSION

The main aim of the present chapter was to examine well-being typologies of inactive secretarial and administrative University employees, with a view to identifying groups of University employees with low levels of well-being. It was proposed that these groups are more important to target for future exercise interventions in the workplace. Included in the cluster solution was the construct of amotivation to exercise due to helplessness beliefs, as this variable might provide useful information for identifying those cluster profiles that are more likely to be attracted to exercise or modular programmes in the workplace. Analysing the groups' priorities for modular-type and exercise programmes/facilities in a new Sport, Exercise, and Health Centre at the workplace of the participants afforded the inactive participants the opportunity to help direct the centre's decisions regarding the nature of the future exercise and wellness programmes which will be implemented in their workplace. The hope is that their information will contribute to effective targeting approaches at this workplace.

Results showed that the well-being data could best be summarised into two distinct clusters. Specifically, participants were either characterised as having "moderate" or "low" well-being levels. Interestingly, although members of the "moderate well-being" cluster appeared to be well-adjusted in all three domains of life on a *relative* level, comparisons with normative data on working males and females suggested lower levels of global self-esteem, which also transcended into lower sense of competence in their jobs. In contrast, the results showed that, on an absolute level, members of this cluster were very satisfied with their jobs and experienced high levels of positive affect at work. Clearly, therefore, it appears that their lower levels of self-esteem originated from sources outside of work. Only future research would be able to examine whether enhancing levels of physical activity may have any effect on the self-esteem of this cluster group. The most notable difference was on physical well-being. In fact, findings revealed that levels of physical self-worth were nearly identical to normative data provided by Fox (1990) on obese males and females. Although it is not clear why this is the case, it may be due to the fact that the sample in the present chapter was physically inactive. Indeed, it makes inherent sense that given the significant and positive links between physical activity and physical self-worth already evidenced in the present thesis, sedentary populations would be more likely to feel less good about their physical selves. The finding may be important given that research evidence has provided support for the adjustment properties of physical self-worth (e.g. Sonstroem & Potts, 1996).

The results of the needs analysis revealed that members of the "moderate well-being" cluster were not as interested in taking part in future exercise programmes in the workplace compared to the second cluster group. Given the relatively low level of amotivation to exercise due to helplessness they exhibited, they may generally believe that exercising could benefit their health, and that they can change their habits. Their lack of interest therefore stems from a different source. It is possible that they do not perceive exercising as very important. Indeed, Pelletier et al. (1999) found that amotivation beliefs and perceived importance are independent constructs.

The second cluster group "low well-being" was very distinct from the members of the "moderate well-being" group. Specifically, these employees were unhappy with all three dimensions of life. It is also important to note the relatively large percentage of

employees in this cluster (i.e. 40.54% of inactive employees), which indicates the extent of well-being problems in this population. It is not possible to infer the nature of causality between the well-being problems, but clearly, this group of employees would benefit from efforts that might enhance any of the types of well-being. It is possible that work-site exercise or modular-type intervention studies could ameliorate the well-being of these employees, if implemented according to the needs of this population.

The needs analysis for exercise programmes/facilities in the workplace for this cluster revealed that a substantial proportion of them were interested in joining programmes. Specifically, more than fifty percent of members of the "low well-being" cluster wanted to engage in conditioning and yoga classes, plus using a general gymnasium for strength or endurance training. In contrast, it is notable that smaller percentages prioritised aerobics or circuit classes or any additional sport activities. These findings are perhaps not surprising considering the average intensity of the activities. Whereas yoga and conditioning classes may be considered moderate in intensity, aerobic and conditioning classes, as well as sport activities are associated with a higher level of exertion. Indeed, there may be a case for increasing the availability of exercise classes that are moderate in intensity, in order to attract the physically inactive employee. It has been proposed that exercise that is too vigorous may encourage drop-out. Specifically, a recent randomised controlled trial involving a large sample of sedentary adults showed that high intensity exercise leads to lower levels of adherence (Perri et al., 2002).

In addition, there was a great interest in weight management programmes for members of the "low well-being" cluster, despite the fact that the mean BMI of both cluster groups were considered in the healthy range. This is an intriguing finding. It is possible that the very low levels of physical well-being among members of the "low well-being" cluster was a reflection of poor body image and body satisfaction, and that their actual height to weight ratio would not make a difference to their physical well-being. Indeed, Davis (1997) has suggested that the unrealistic ideals of women today make some normal-weight women dissatisfied and preoccupied with their weight. Considering the large proportion of women in the "low well-being" cluster, this is a possibility for the high interest in weight management programmes. However, on a positive note, the interest in weight management programmes, along with their high

level of interest in health and fitness appraisal services, shown by this group are inherently linked to exercise programmes, and if and when any of them choose to make use of these services, these successes may promote a higher degree of commitment to exercising.

Their interests may also be seen in the light of their very low levels of amotivation to exercise due to helplessness beliefs. These results indicate that this group may be more approachable for exercise interventions than expected. Considering research findings showing that the construct of amotivation is negatively associated with intentions to be physically active (Ntoumanis, 2001; Standage et al., in press), it is very positive that the "low well-being" cluster exhibited very low levels of exercise amotivation. Indeed, the present study showed that seventy percent of members in this cluster intended to engage in regular exercise within the next six months. However, it remains to be seen whether intentions to be physically active materialise into increased exercise behaviour. In fact, one of the limitations of the present study is that intention is not the only determinant of behaviour. Although a meta-analytic study found that intention to exercise highly predicted actual exercise behaviour (Hausenblas, Carron, & Mack, 1997), the prediction of intention on behaviour is affected by the length of the time interval between the measurements. However, the nature of the present study allows for follow-up data regarding the size of the link between exercise intention and behaviour in six months' time.

The amotivation to exercise scale was constructed for the purpose of the present study, but results indicated some potential problems with discriminant validity given relatively high correlations coefficients between items from different sub-scales. Clearly, items need to be refined in future research. It was evident that the construct of amotivation, as operationalised in the present study, was not as useful a construct as expected for this population.

Another limitation of the present study is the relatively small sample size. The reason for that may be due to sedentary individuals overestimating their levels of moderate intensity activity (Duncan et al., 2001), or because the criteria with which the inactive sample was selected was too stringent. Indeed, some inconsistency in the definition of sedentariness exists in the literature. For example, Casperson, Powell, and Christenson (1985) defined it as no thirty minute session of moderate physical activity

per week or no twenty minute session of vigorous intensity exercise per week, a definition that is much less strict than the one adopted in the present study. In any case, the estimation of physically inactive employees in the present study may therefore have been rather conservative. Nonetheless, given the relatively small number of inactive employees in this study, it would be useful to replicate the cluster analysis with a larger sample.

In sum, no previous research has examined well-being typologies of a physically inactive University population. The distinct typologies that emerged were successfully validated on negative affective states at work, and re-demonstrated the need for considering the relationship between physical activity and mental well-being as multi-dimensional. Examining the needs of the cluster groups may be useful to add further insight into the way in which intervention programmes might be implemented more effectively. Indeed self-selection of already healthy and active participants to worksite exercise programmes is recognised as one of the major methodological problems in the evaluation of employee exercise programmes (Griffiths, 1996; Shephard, 1999). Employees who are physically inactive and have very low levels of well-being, and hence who are "at risk" both physically and psychologically, are important to identify as they may have the greatest to gain from employee exercise programmes. The needs analysis of this group can form a second step in the targeting process.

CHAPTER EIGHT: DISCUSSION AND CONCLUSIONS

This thesis examined the nature of relationships between physical activity and mental well-being in corporate and University populations, using varying approaches. Specifically, three components of well-being were examined; physical, work-related, and global well-being, and different analyses were carried out to examine their links with exercise and physical activity. In this chapter, a summary of the studies is presented in Table 8.1. Furthermore, the main findings of the studies are synthesised to provide a general overview of this work, and a schematic representation of the main findings is suggested. In addition, the limitations of the studies are presented, along with practical implications for corporate exercise professionals. Finally, suggestions are made for future research that may build on the findings of this thesis, and ultimately help to advance the knowledge of how to design effective wellness-enhancing physical activity interventions in the workplace.

A SYNTHESIS OF THE FINDINGS

The importance of the concept of "positive psychology" is increasingly emphasised given its important consequences for human functioning (Seligman & Csikzentmihalyi, 2000). As stated by Seligman and Csikzentmihalyi, positive psychology concerns an interest in "building positive qualities" and is less focused on alleviating negative mental health, a topic which has already been extensively researched. The promotion of mental well-being is a key element in the new movement towards enhancing the positive qualities in life. In the work setting, however, there has been a dearth of research into positive psychological qualities. In contrast, it has focused on dealing with occupational health and safety hazards and alleviating stress. Although these issues are undoubtedly important and interesting, research examining factors that may enhance positive well-being among employee populations are of equal importance.

Physical activity may be one of the means by which the well-being of employees can be enhanced. There is now wide consensus that physical activity is related to well-being among a wide range of populations (e.g. Biddle, Fox, & Boutcher, 2000). However, although the relationship between physical activity, fitness and occupational health have been researched, there is a general lack of studies which have examined the relationship between physical activity and indicators of mental well-being of immediate relevance to employees.

Table 8.1. Summary of the main characteristics of the studies in this thesis

Study	Sample	Measures	Purposes	Results	Conclusions
1	312 corporate employees (*M* age=34.11, *SD*=8.07)	1. SWLS 2. ASPP (global self-worth and perceptions of job competence) 3. Job satisfaction 4. JAS 5. PSPP (physical self-worth) 6. Physical satisfaction	1. Examine differences in three components of well-being between employees engaging in different levels of physical activity 2. Examine whether physical self-worth is significantly related to affective states at work when controlling for global self-esteem 3. Test a hierarchically conceptualized model of direct and indirect relationships between exercise and the three components of mental well-being	1. Significant differences existed between the physical activity quintiles on physical well-being, job satisfaction, relaxation and enthusiasm at work, and life satisfaction. 2. Physical self-worth was significantly associated with enthusiasm and fatigue at work when controlling for global self-esteem 3. The hypothesised model fit the data very well. Exercise was directly related to physical self-worth, physical satisfaction and enthusiasm at work. Exercise was indirectly associated with self-esteem through physical self-worth, life satisfaction through physical satisfaction, and job satisfaction through enthusiasm at work	1. A very physically active lifestyle appeared to be associated with more favourable levels of physical-, work-related, and global well-being. Some support for dose-response relationships 2. High levels of physical self-worth may have emotional adjustment properties in the work setting 3. The exercise and well-being model provided useful information regarding the structure of the interrelationships between exercise and the three components of well-being. Measures of physical well-being and positive affective states at work may shed light on potential mechanisms linking exercise with positive well-being
2	As in Study 1	As in Study 1	1. Examine physical activity and mental well-being typologies in corporate employees and describe them on gender and job title distribution	1. Four distinct clusters were identified: "The self-assured employee" (*n*=87), "The unhappy employee" (*n*=86), "The exercising happy employee" (*n*=66), and "The	1. The cluster analysis indicated that multi-dimensional relationships may exist between physical activity and mental well-being in

			2. Validate the cluster solution on negative affect at work	physically unhappy employee" (n=55). No significant differences existed in gender or job title distribution between the cluster groups 2. The clusters differed significantly on nervousness and fatigue at work with "The unhappy employee" cluster scoring significantly higher on both constructs compared to the remaining cluster groups.	corporate employees. 2. Exploring physical activity and well-being typologies in corporate employees may be useful to identity populations "at risk".
3	A judgment sample of 10 individuals selected based on membership to the four cluster groups in Study 2. Each individual case was analysed separately.	An interview schedule consisted of five main sections: 1. General questions to establish rapport 2. Level and sources of well-being 3. Relationships among well-being variables 4. Relationships between exercise and well-being constructs 5. Change in well-being	1. Provide qualitative confirmatory support for the cluster solution established in Study 2. 2. Explore potential psycho-social mechanisms explaining the link between exercise and mental well-being in employees.	1. In forty-three out of sixty possibilities the cluster profiles matched the information from the interview accounts. In the remaining instances, most of the discrepancies were due to changes in personal circumstances, a change in lifestyle, organisational changes, or the ability to employ strategies working to maintain well-being. 2. The main mechanisms explaining the link between exercise and well-being identified by the participants were: enhancing job productivity, regulating moods, coping with stress, means of meeting important goals and needs, time-out, socialising, and mastery experiences and enhancing autonomy.	1. There may be great utility in developing well-being typologies to identify those sub-groups who are coping poorly in life and/or at work. 2. The regulation underlying the exercise behaviour may potentially explain why physical activity may only work for some people to enhance levels of well-being but not for others.

4	776 secretarial and administrative University employees (*M* age=43.03, *SD*=11.54)	1. As in Study 1, PLUS 2. Exercise identity 3. BREQ 4. Physical activity (modified from Aerobics Center Longitudinal Study Physical Activity Questionnaire)	1. Examine well-being typologies, validate them, examine membership to physical activity groups, and compare them with clusters from Study 2. 2. Examine differences between physically inactive employees and those engaging in different types of physical activity (exercise/sport, active living, exercise/sport plus active living) 3. Examine the role of self-determination to exercise in accounting for any differences in well-being between the three physically active groups 4. Examine the role of controlling types of exercise regulation versus the role of autonomous types of exercise motivation in the prediction of the three components of well-being	1. Four distinct well-being clusters were identified: "The unhappy employee" (*n*=107), "The moderately happy employee" (*n*=192), "The satisfied employee" (*n*=300), and "The unhappy with work employee" (*n*=132). Significant differences existed between the clusters on negative affective states at work. There were no significant differences between the groups on distribution to membership in the physical activity groups, gender distribution, or job title distribution. Well-being profiles were relatively similar to those in Study 2. 2. Significant differences existed between physical activity groups in physical well-being, and enthusiasm and fatigue at work 3. The differences existing between the physically active groups in physical and work-related well-being became non-significant when controlling for self-determination to exercise 4. Autonomous types of exercise motivation predicted scores on most well-being variables in a positive direction. Introjected exercise regulation predicted some	1. Approximately one third of the University population examined exhibited discouraging levels of global and physical or work-related well-being. 2. The physically inactive group had the lowest levels of well-being, which demonstrates the importance of examining this sub-group in isolation. 3. The regulation underlying exercise behaviour may be at least as important for well-being as performing the behaviour in the first place. 4. The process of exercising may be a key in understanding the relationship between exercise and well-being.

				well-being variables significantly in a negative direction.	
5	Those identified as physically inactive in Study 4: 74 secretarial and administrative University employees (*M* age=46.00, *SD*=10.39)	1. As in Study 1, PLUS 2. Amotivation to exercise (modified from AMTES)	1. Exploring typologies of physical inactivity and well-being with a view to identifying those physically inactive employees who appear to be "at risk". These were described on gender, age, body mass index, and job title distribution 2. Validate the cluster solution on negative affect at work and specific exercise amotivation beliefs 3. Examine the needs of the clusters for modular-type and exercise programmes/facilities in a new Sport, Exercise and Health Centre in the workplace	1. Two cluster groups were identified: "Moderate well-being" (*n*=44), and "Low well-being" (*n*=30). The "Low well-being" cluster exhibited very low levels of well-being on all three components of well-being relatively as well as compared to existing norms. Amotivation to exercise was low for both groups. There were no significant differences between the clusters on gender, age, body mass index, or job title distribution 2. A significant difference existed between the cluster groups on negative affective states at work. There were significant differences between the clusters on specific exercise amotivation beliefs. 3. The "Low well-being" group appeared most interested in joining some future modular and exercise programmes in the workplace and seventy percent of them intended to become more active within the next six months.	1. It is possible that physically inactive employees may be more "at risk" of well-being problems compared to physically active employees, given the extraordinarily low levels of well-being exhibited by a large proportion of the sample 2. It was promising that participants in the "Low well-being" cluster were generally interested in joining moderate intensity exercise programmes or facilities 2. Knowing the needs of a group of interest may be a useful aid for future targeting strategies. 3. Those physically inactive employees with low levels of well-being should be a targeting priority for work-site exercise professionals looking to implement more effective exercise programmes.

Concurrently, researchers have advocated the introduction of comprehensive or "holistic" approaches to measuring the well-being of employees (Danna & Griffin, 1999; Hart, 1999), based on the assumption that different spheres of life are not segregated. In the present thesis, three components of mental well-being were included; physical-, work-related-, and global. The inclusion of these components has provided some further insight into how physical activity and exercise is related to different aspects of employees' lives.

Structure of relationships between exercise, the physical self and mental well-being

As a consequence of the above points, a full latent factor SEM of exercise and the three components of well-being in Study 1 was constructed based on hierarchical principles to test the direct and indirect relationships between exercise and mental well-being in a sample of corporate employees. Specifically, the hypothesis stating that exercise would relate directly with more domain-specific constructs of well-being (physical well-being, and positive affective states at work), and indirectly with more global components of well-being (job satisfaction, life satisfaction, and self-esteem) was supported. This result was supported by multivariate analyses showing that the most physically active participants were significantly better off in terms of elements of physical, work-related and global well-being.

An interesting finding from Study 1 was that exercise behaviour as well as feelings about one's physical self (physical self-worth) were significantly related to indicators of both global and work-related well-being. In addition, a partial correlation analysis indicated that physical self-worth was positively correlated with enthusiasm at work (r = .23), and negatively related to fatigue at work (r = -.13) when controlling for global self-esteem. Indeed, recent research has evidenced the start of research examining the well-being properties of levels of physical self-worth. Using different populations, Sonstroem and Potts (1996) and Van de Vliet et al., (2002) have demonstrated that self-esteem does not fully mediate the relationship between physical self-worth and affective states, and the result from the present thesis therefore build on previous findings in a population of corporate employees. Interestingly, in the interview study in Chapter 5, one participant gave some indication regarding the nature of the relationship between feelings about the physical self and experiences at work. She

specifically stated that feeling good about the physical aspects of oneself and feeling physically strong contributed to feelings of capability in the job because physical worth and satisfaction counteracted feelings of vulnerability in social situations. From a social psychological point of view, it is therefore also possible that physical self-worth and satisfaction served to project desirable characteristics in the work setting. Clearly, these suggestions provide ideas for some interesting future work.

Although preliminary, the results from the first study provided some useful information regarding the complex structure of relationships between exercise and well-being in a relatively physically active corporate population. For example, it illustrated how exercise may be indirectly related to job satisfaction through enthusiasm at work. Although due to the global nature of the construct, job satisfaction is determined by a range of factors, many of which related to the intrinsic aspects of the job (Arnold et al., 1998), the finding from Study 1 indicates that promoting positive affective states at work can enhance overall feelings of satisfaction with the job. In turn, the efficacy of exercise in enhancing feelings of enthusiasm at work was supported both by results from the model in Study 1, and by the interview accounts. Specifically, in Study 3, several of the physically active interviewees reported that exercise served regulatory purposes by changing undesirable feeling states.

Multi-dimensional relationships between physical activity and mental well-being

Although findings supported the relationships between exercise and the three well-being components, research has also indicated that physical activity does not work to enhance well-being for everyone. For example, the motivational climate in which an individual exercises may have profound effects on the sense of well-being the participant experiences (Ntoumanis & Biddle, 1999a). Likewise, research has shown that the intensity of physical activity can have repercussions for affective experiences (Moses et al., 1989; Parfitt et al., 1996). Based on these previous findings, using the same sample, the hierarchical cluster analysis in Study 2 examined typologies of physical activity and mental well-being with a view to exploring the multi-dimensional relationships between physical activity and mental well-being. Indeed, interesting findings emerged. As predicted, the typologies were distinct on the well-being variables, and confirmatory material in the form of qualitative data was provided in

Study 3. The mean scores on each of the well-being variables were compared to established norms, which documented the well-being of each cluster in absolute terms. Notably one of the cluster groups were characterised as having low levels of well-being ("the unhappy employee") on most well-being variables. Other clusters such as the "exercising happy employee" and the "self-assured employee" were coping very well in life, with high levels of well-being either stemming from being happy and content with their work situation or the physical aspects of themselves and/or feeling good about themselves and their lives in general. Despite these wide differences in well-being the scores on physical activity indices were relatively similar for all the clusters, except for one cluster (the "exercising happy employee"). In brief, these findings provide support for the contention that, indeed, multi-dimensional relationships exist between physical activity and mental well-being in this population.

Exercise regulation and mental well-being

Subsequent to the findings from Study 2 demonstrating the multi-dimensional relationships between physical activity and mental well-being, the interviews which were carried out in Study 3 illuminated some of the reasons why exercise may only enhance well-being for some individuals. Specifically, one notable example was a woman ("Lisa") who engaged in regular structured exercise that did nothing to enhance any aspect of well-being. In fact, she pointed out that exercise made her feel worse about herself because she always lost in her squash games. Exploring her feelings and motivations about engaging in physical activity revealed that she exhibited what could be characterised as introjected regulation for exercise (exercising out of feelings of guilt). In contrast, for the interviewees described as the "exercising happy" employees ("Alice" and "Rebecca"), exercising appeared to represent much more than engaging in the behaviour. Rather, it signified making progress towards important goals, and experiencing enjoyment. Their motivation to exercise was therefore much more autonomously regulated.

Based on the above findings, the following study (Study 4) aimed to provide some generalisability to the suggestion that it may be the regulation underlying the behaviour that is important for understanding why physical activity is related to well-being. Based on SDT, it was therefore examined how each of four types of exercise motivation

(external, introjected, identified, and intrinsic) predicted well-being using a sample of University secretarial and administrative employees. The results of the study demonstrated that self-determined forms of exercise motivation, and most notably intrinsic motivation, significantly predicted indicators of well-being in a positive direction. In contrast, introjected exercise regulation predicted well-being variables negatively. Therefore, the results supported postulations of SDT stating that autonomously regulated behaviours are associated with more positive outcomes (Ryan & Deci, 2000), and previous findings in the literature (Maltby & Day, 2001; Rovniak et al., 1998). Using an exercise self-determination index, two MANCOVA analyses were carried out in the same study revealing that, after controlling for autonomy, the significant differences that existed in physical- and work-related well-being between the exercise/sport group, the active living, and the combined group (i.e. exercise/sport plus active living) became non-significant. These findings demonstrate that the reasons for engaging in exercise are as important or maybe more important than the amount of exercise people engage in, in terms of psychological well-being. This provides preliminary evidence to previous suggestions that the process of exercising may provide a vital cue towards a better understanding of the relationship between physical activity and mental well-being (Fox, 1999; Rejeski, 1994). The complexity of this relationship is therefore evident, and may explain why, as yet, no universal dose-response prescription guideline exists.

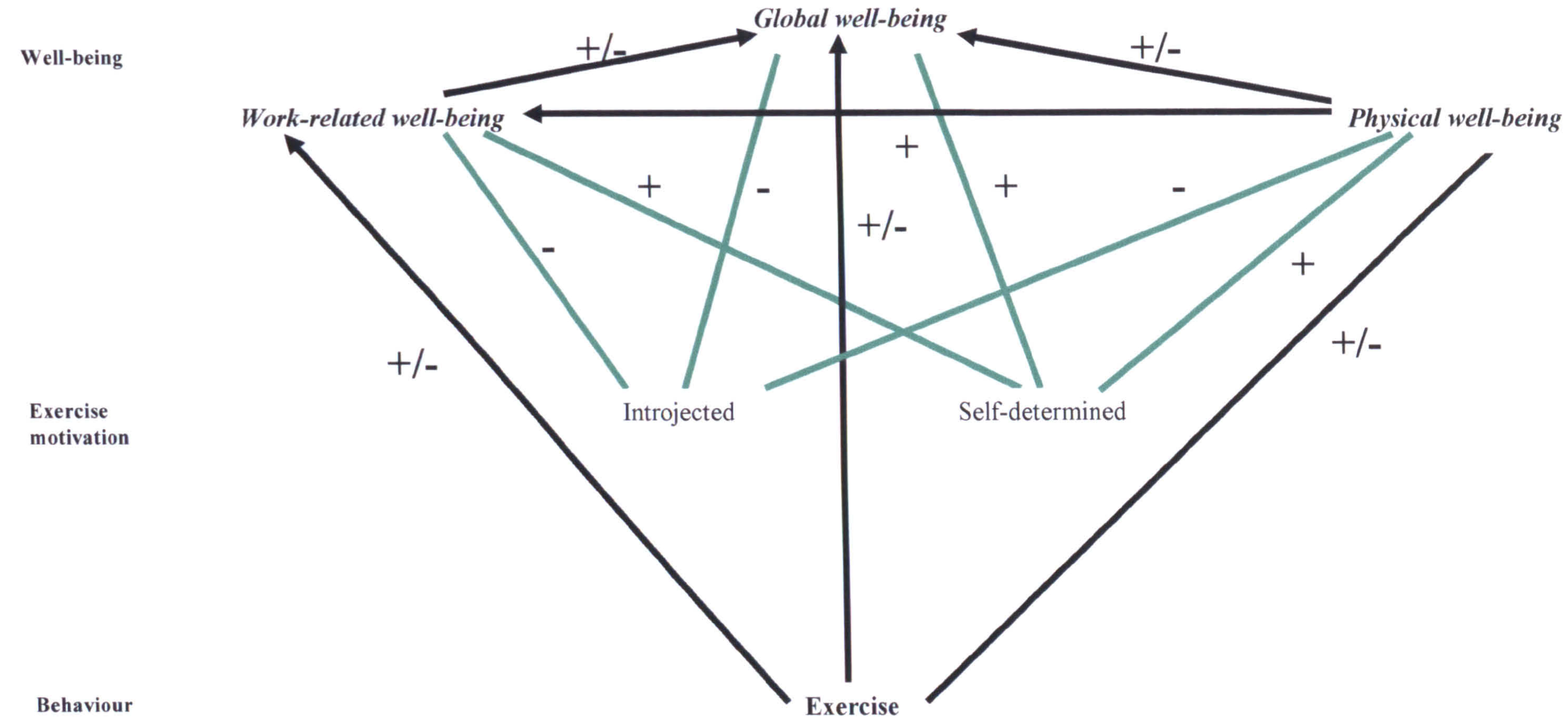
Typologies of well-being among physically inactive employees

In the final stage of this thesis, attention was focused specifically on those characterised as physically inactive among the sample of University secretarial and administrative employees. The analysis examined typologies of well-being using hierarchical cluster analysis among this group, with a view to identifying that sub-group of a physically inactive University population who had low levels of well-being and therefore those who should be targeted for future work-site exercise interventions. Amotivation to exercise was included in the typologies given its implications for intention to engage in future programmes or activities. An additional feature of the study was to assess the needs or priorities for modular-type and exercise programmes in a future Sport, Exercise, and Health Centre. The results of the study, once again, pointed towards

multi-dimensional relationships between physical activity and mental well-being. Specifically, whereas one of the physically inactive groups demonstrated a reasonably healthy psychological profile, the second group could be characterised as unhappy on all three components of well-being. However, it was interesting to note that the latter group had slightly lower levels of amotivation to exercise, had relatively high levels of intention to engage in regular structured exercise programmes, and were more interested in joining weight management and yoga programmes in the new centre compared to the other cluster group. This is good news, given that this group appeared to be more in need of joining such programmes. The level of interest in different types of programmes indicate the level of opportunity to target a group that is "at risk" both from a physical (lack of physical activity) and a psychological (low levels of well-being) point of view.

In sum, the studies carried out in the present thesis illuminated three important aspects with regard to the relationship between physical activity and mental well-being in two different populations of employees. First of all, they revealed more about the structure of these relationships, that is, that the relationships can generally be considered multi-dimensional. Secondly, they highlighted the importance of considering exercise motivation as an important process that may partly explain the relationship between physical activity and well-being. A simplified illustration of relationships relating to the above two findings is provided in Figure 8.1. The model is a preliminary attempt to integrate and organise these findings. The black arrows represent the multi-dimensional relationships between exercise and the components of mental well-being, and the green arrows illustrate how introjected exercise regulation, i.e. a type of controlled motivation, demonstrated negative relationships with well-being whereas self-determined exercise motivation was positively associated with well-being. Finally, the studies provided useful information for corporate health leaders who want to target specific groups for wellness-enhancing exercise programmes in the workplace.

Figure 8.1. A suggested schematic representation of main findings



Note: +/-: Illustrating the multi-dimensionality of relationships between variables

METHODOLOGICAL LIMITATIONS

The present thesis inevitably has some methodological limitations which need to be taken into consideration and addressed by future research. First of all, the response rate for the sample used in studies 1 and 2 was relatively low, and therefore, the results might not be representative of the whole sample. However, clearly there are several important factors to consider. First of all, as mentioned in the discussion in Study 1, the physical activity and mental well-being typologies were distinct (at least on the well-being variables), and this heterogeneity may be one indication of representativeness. In fact, the study served its purpose by demonstrating the multi-dimensional structure of relationships between physical activity and components of mental well-being. Secondly, although using a different population, the sample in studies 4 and 5 reached a substantially higher response rate which appeared to be representative on several demographic variables. The findings from Study 4 generally supported findings from Study 1. In other words, the well-being typologies identified in the two studies using two different samples were relatively similar.

The second limitation was that the data were cross-sectional which delimits any conclusions regarding issues of causality. It is therefore possible that happy people are more likely to take up exercise compared to unhappy individuals. In order to conclude that physical activity or exercise has a definite causal role in the relationship with well-being, it would be necessary to carry out a randomised controlled trial (RCT). However, as argued by Shephard (1999), it is difficult to carry out experimental designs in the workplace due to legal reasons. This is because unions often insist that all employees should have access to workplace wellness facilities, which would not be possible in a RCT where it is necessary to employ a control group.

Although most of the data in the present thesis was cross-sectional, two considerations need to be taken into account. First of all, the model in Study 1 was based on an integration of theory and previous research findings, which bring some degree of credence to the suggestion that exercise may work to enhance different components of well-being. Secondly, the interviews in Study 3 allowed for an examination of the direction of the relationship between physical activity and mental well-being on an individual level. Indeed, when asked about how physical activity related to elements of well-being, most of the interviewees indicated that physical

activity worked to enhance them. The above considerations therefore suggest that physical activity may play a causal role.

Finally, on a conceptual note, Jex (1991) has suggested a range of dispositional characteristics that may partly account for any effects of exercise on mental health. He argued that important constructs to consider were self-motivation, dispositional optimism, negative affectivity, and locus of control. For example, Carver and Scheier (1987) found that individuals with higher levels of dispositional optimism are more likely to report fewer physical symptoms and recover more quickly from surgery than their less optimistic counterparts. Likewise, Jex (1991) suggested that more optimistic people may exercise more consistently than less optimistic individuals because optimists may be more likely to expect that their efforts lead to the positive outcomes they desire. However, it is important to stress that the support for any of the above dispositional variables have not been examined extensively, and, at best, the evidence is indirect. While the findings of any study would be strengthened by controlling for as many different dispositional characteristics as possible, due to space limitations this is not feasible. As a consequence, the above variables were not included in the present thesis, but it may be worth examining the contribution of these in future research.

In addition, the comparative effects of exercise versus other techniques (e.g. relaxation) on the well-being of different populations of employees could have been examined. Finally, future longitudinal research studies are needed to evaluate the longer-term effects of employee exercise programmes.

PRACTICAL IMPLICATIONS

Ultimately, one of the questions that remain is how the findings from the present thesis may apply to corporations looking to implement physical activity programmes in the workplace. There are several issues to consider here. First of all, by examining the structure and nature of the relationships between physical activity and elements of well-being that may be relevant to employees, support may be strengthened for the use of physical activity in wellness enhancing programmes in the workplace. Indeed, it is argued here that, apart from the well-being benefits physical activity may generate on an individual level (e.g. increased self-esteem and life satisfaction), from an employers perspective, the implications of enhanced well-being among their staff may lead to

favourable workplace outcomes. For example, as discussed in Chapter 2, participation in workplace exercise programmes has been associated with indicators of productivity, such as lower rates of absenteeism (e.g. Kerr & Vos, 1993; Proper et al., 2002). A potentially important finding from the present thesis was the indirect relationship between exercise and job satisfaction through feelings of enthusiasm at work. As job satisfaction and positive affective states at work may predict levels of job performance (Judge et al., 2001; Cote, 1999), this may have clear implications for employers.

The multi-dimensional relationships between physical activity and mental well-being in the present thesis highlight the importance of considering sub-groups within a particular population prior to implementing workplace exercise programmes. For example, some employees may have adequate levels of well-being yet do no physical activity, whereas another physically inactive group may have low levels of well-being. Indeed, in Study 5, this was confirmed. Assuming that physical activity participation may be related to well-being for some individuals, it would seem that the latter group should be targeted due to their maladaptive levels of well-being. In addition, incorporating a needs analysis for programmes for these groups may facilitate the development of effective programmes. Indeed, as argued in Chapter 2, elements of choice may enhance the individual's sense of empowerment and autonomy, which in turn, may increase adherence to programmes (Ryan et al., 1997). It is clear that programme attrition is one of the major obstacles facing corporations who implement employee exercise programmes (Shephard, 1996a).

In order to truly substantiate the suggestions made here, that the development of physical activity and well-being typologies may be an imperative step in the development of more effective programmes, it would be necessary to target those individuals, develop programmes based around their needs, and evaluate the success of the strategy. Unfortunately, this was beyond the scope of the present thesis. However, it is argued here that the findings may build the foundation for future work. For example, the results from the last study of the present thesis may be directly used to develop programmes for the new Centre for Sport, Exercise and Health, that are based around the needs of the group which is considered "at risk". Promotional material, leaflets and posters which adopt appropriate motivational strategies for this group of employees are

examples of the type of material that the centre can develop to attract these employees once the programmes are developed.

Although undoubtedly it would appear more beneficial to target those employees with low levels of well-being for future interventions, there is some evidence in the literature to suggest that it may be important not to ignore those groups of employees who are already at "low risk" of becoming ill. Although the research was not focused on well-being risks but traditional health risks, Edington (2001) demonstrated the importance of low risk maintenance programmes. Specifically, he found that the mean cost increase for each increased health risk, such as inactivity, smoking, and high blood pressure, is higher than the mean cost decrease for every health risk that is decreased. If, indeed, this is also relevant to employee exercise programmes which are focused on well-being enhancement, it would imply that those who already have psychologically "healthy" profiles should not be ignored for interventions. However, it is important to stress that it is more than likely that the needs of this group of employees would be different from those with initial low levels of well-being, and that different targeting strategies and interventions programmes should be developed for each of these groups.

It was indicated in Study 4 that the regulation underlying exercise behaviour may be an important consideration when trying to understand the differential effect of exercise on well-being. Specifically, the results suggested that autonomously regulated exercise behaviours are generally more positive and stronger predictors of well-being, whether operationalised as physical-, work-related-, or global well-being. This may have important implications for the design of employee exercise programmes. If exercise leaders can promote feelings of autonomy and self-determination among their participants, it may optimise well-being, whereas in settings where participants feel externally or internally coerced to exercise, at best the consequence may be that the exercise may have no effect on well-being, and at worst, it may have detrimental effects on levels of well-being. An added disadvantage to controlled exercise regulation is that research has shown that external exercise regulation is a negative predictor of future participation levels in exercise settings (Pelletier et al., 1995). As a consequence, participants are more likely to drop out of such programmes.

The question then remains as to how feelings of autonomy may be promoted among exercising employees. First of all, based on predictions of SDT (Deci & Ryan,

1985), the provision of choice for physical activities in the workplace may enhance feelings of intrinsic motivation once the employees engage in the programmes. Secondly, the dominant motivational climate of exercise sessions may have an impact on feelings of self-determination. For example, an exercise leader that is autonomy-supportive, that is someone who emphasises a choice of tasks may be more likely to increase intrinsic motivation among his or her participants. In addition, if task climates are emphasised (i.e. when success is defined and evaluated based on individual effort and improvement, and the participants are involved in the decision-making process), participation may lead to an increase in positive affect and intrinsic motivation (Ntoumanis & Biddle, 1999b). In contrast, situations in which the focus is on competition and inherent ability are likely to be associated with maladaptive well-being and worry (Ntoumanis & Biddle, 1999b). Finally, the results of Study 4 indicated that participants need not necessarily to enjoy the exercising process, but value the benefits of it.

FUTURE RESEARCH DIRECTIONS

Undoubtedly the work in the present thesis represent only a preliminary attempt to understand the structure and nature of the relationship between physical activity and well-being components in employees. As a consequence, much more research needs to be carried out before any definite answers can be provided regarding how best to use physical activity to enhance the well-being of employees. The following suggestions present just some of the possibilities for future research that may carry the work of the present thesis forward.

The hierarchical conceptualisation of the exercise and well-being model in Study 1 represented a preliminary attempt to integrate theory and findings from the divisions of exercise, mainstream, and organisational psychology to better understand the structure of the relationships between exercise and components of well-being relevant to employees. Although the model provided an excellent fit to the data, there is a clear need to replicate the model with different populations of employees and with longitudinal data to add strength to the conclusions.

The three well-being components examined throughout the present thesis were included based on the assumption that domains of life "spill-over" into other domains,

and are not segregated aspects of life. In addition, part of the rationale for including physical-work-related- and global components of well-being was based on the prediction that exercise participation would be directly or indirectly related to these. However, given the scope of well-being components, without doubt, there are additional components of well-being that could have been included, such as social well-being. A more all-encompassing exercise and well-being model should be tested in future research that adopts large sample sizes.

The physical satisfaction scale that was incorporated throughout the present thesis needs to be further validated in future research, specifically in terms of how it differs from physical self-worth. On one hand, parallels could be drawn between physical satisfaction and physical acceptance as conceptualised in the Exercise and Self-Esteem Model (Sonstroem & Morgan, 1989), and indeed, when testing this model, Baldwin and Courneya (1997) used a measure of physical satisfaction to capture the physical acceptance dimension of the model. On the other hand, some may argue that a person might be dissatisfied with physical aspects of themselves, yet accept that fact so that self-esteem is not affected negatively. Finally, there was some indication that physical satisfaction, as measured throughout the present thesis, is moderately related to life satisfaction. Indeed, it is likely that physical satisfaction could be conceptualised as a domain of life satisfaction, and one which is more all-encompassing than the life domain labelled "health" in existing constructs measuring satisfaction with domains of life (Cummins, 1997; Frisch, 1999), which clearly neglect satisfaction with external attributes. The refinement of the physical satisfaction construct could potentially be important for understanding more about the relationship between physical activity and life satisfaction.

The association between physical activity and positive affective states experienced at work would be an interesting venue to explore further. Specifically, although randomised controlled trials have been carried out examining the effect of exercise on positive affect (Biddle, 2000; Yeung, 1996) and showed favourable effects, longitudinal research designs could be adopted which examined the temporal relationship between participation in exercise programmes or activities during lunchtime on affective states using the Job Affect Scale (JAS) over a few weeks duration.

Given the maladaptive well-being profiles of physically inactive University administrative and secretarial employees in Study 5, it would appear that the examination of the combination of low levels of physical activity and low levels of well-being among employees deserves more research attention. Indeed, it is clear that there is a general lack of work-site studies which have specifically examined high risk groups. Indeed, the advantage of the findings from the present thesis is the possibility of identifying these groups. Specifically, appropriate exercise interventions should be implemented in order to investigate the effects of physical activity on levels of well-being in these groups. It would also be useful to carry out studies which contrasted the effect of alternative workplace health promotion programmes (e.g. relaxation programmes) with exercise programmes that are based around the needs of these employees. Furthermore, behavioural risk factors (such as physical inactivity and high fat or sugar intake) seem to cluster together (Campbell et al., 2000), and it would be useful if future research studies could identify which other health risk factors are associated with the combination of physical inactivity and low levels of mental well-being. This, in turn, may illustrate further the need to target these groups for interventions and develop modular health promotion programmes that are designed around the combination of needs among these groups.

As already discussed in Study 4, one of the major findings of the present thesis is that the regulation underlying exercise behaviour may be one of the major underlying reasons for any effects of physical activity on well-being. It is only recently that evidence for this suggestion has started to appear, but to my knowledge no experimental research has examined whether, in fact, types of exercise motivation *cause* differences in well-being. If indeed, it can be shown in future research that types of exercise motivation cause different levels of well-being, ultimately, it would be very useful to examine how best to promote self-determined types of exercise motivation in participants in workplace exercise programmes. Organismic Integration Theory (Deci & Ryan, 1985) proposes that certain contextual factors may facilitate the internalisation ("taking in") of behaviour so that it becomes more self-determined. For example, in an experimental design, Deci, Eghrari, Patrick, and Leone (1994) found that providing a meaningful rationale and acknowledging feelings among participants performing a tedious task, promoted the internalisation of that behaviour. Research should therefore

attempt to identify those contextual factors that may promote the internalisation of exercise behaviour in those participants who exercise because they feel they have to or out of feelings of guilt. In addition, although the present work focused on the role of feelings of autonomy as partly explaining the link between physical activity and well-being, the role of other process-oriented factors, such as social interaction, should be explored in future research. Studying the interaction of these different factors in predicting well-being may provide more vital information.

Keeping the above mentioned implications for practice and research in mind, future research should aim to examine the financial outcomes of work-site exercise programmes that are designed to improve well-being. This may be done by investigating the effects on absenteeism rates, recruitment and retention of employees. Clearly, these types of studies require high levels of cooperation between researchers and management of corporations. However, if successful, convincing managers of the importance of implementing work-site exercise programmes designed to enhance well-being may become easier.

CONCLUSION

The need to establish more effective exercise interventions in the workplace has been pointed out frequently in the literature (Shephard, 1999). In addition, most exercise interventions have focused on decreasing physical health risks. In contrast, the amount of work-site exercise programmes that are designed in order to enhance the mental well-being of employees specifically is scarce. Studies which have examined the effect of these programmes on well-being have generally shown equivocal results (Proper et al., 2002; Shephard, 1996b). This may partly be because of the general paucity of research which has taken a structured approach to the study of well-being in this population. In addition, recent conceptualisations of well-being in employees take into consideration context-free as well as more specific aspects of well-being. In view of the above, the present work examined the structure and nature of the relationship between physical activity participation and three more or less specific components of well-being in corporate and University employees. The multi-dimensional relationships between physical activity and well-being may be partly seen in the light of the regulation underlying exercise behaviour. The results may have practical implications and may

provide some ideas for work-site exercise professionals, and can form the backdrop for future research directions.

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APPENDICES

APPENDIX 1

Study number: **E4893**

INFORMATION SHEET FOR PARTICIPANTS

Date: March 2001

Title: Exercise and components of mental well-being in corporate employees

You are being invited to take part in a PhD research study carried out at the University of Bristol. This research study examines elements of mental well-being of corporate employees, and the contribution of physical activity to well-being. The information from the study will help us to find out how we can improve the quality of life of employees. The results of the study may also help the management of your organisation to better meet your needs in terms of well-being at work. To this end, we should be grateful if you would complete a brief questionnaire.

- If you choose to participate in this research study, you may receive useful information regarding your mental well-being at work. An individualised profile will be available upon request. Furthermore, there will be a prize draw for £100.
- There are absolutely NO risks associated with taking part in this research study. Furthermore, we will completely respect the confidentiality of your information, and your answers will be immediately coded and your name removed for all analysis. ONLY GROUPED data will be available to your organisation, so your individual answers will NOT under any circumstance be disclosed except to return them to you on request.
- The questionnaire will be distributed to all employees at your work-site. If you do not wish to participate, you may disregard the questionnaire, and the decision you make will NOT influence your status at work in any way.
- In the questionnaire, you will be asked whether you are willing to be interviewed on a one-to-one basis of 25 minutes duration. The interviews will help us to uncover some of the mechanisms that may help people to feel better at work. If you consent, this interview will be audio-taped, and is completely confidential. The decision whether to participate in an interview does NOT affect the status of the participants in the study. You may withdraw from this research study at any time without giving a reason.
- If you should have any questions concerning the study please do not hesitate to contact the researcher: Cecilie Thogersen, Bristol University, Department of Exercise & Health Sciences, Priory House, 8 Woodland Road, Bristol, BS8 1TN, tel: 0117 954 6383.

THANK YOU VERY MUCH FOR READING THIS INFORMATION SHEET

Yours sincerely,
Cecilie Thogersen & Professor Ken Fox, Bristol University

APPENDIX 2

ACTIVITY HABITS AND FEELINGS

Introduction:

This research survey examines the role physical activity plays in people's everyday life. It is an independent project carried out by The University of Bristol. Only a group report will be available, therefore, your individual answers will NOT be disclosed under any circumstances to the management of your organisation. Please provide your name at the end if you would like to enter the prize draw for £100. Only fully completed questionnaires will be considered for the prize draw. Also provide your name at the end if you would like to find out how your scores compare to the group scores. This information will be provided on an individual basis. This is not an intelligence test, so **there are no right or wrong answers**. Please be as honest as you can!

Self-Evaluation Questionnaire:

Please tick your sex:	oMale	oFemale			
Please indicate your marriage status:	oUnmarried	oMarried			
How many children do you have below age 6?	oNone	o1-2	o3 or more		
Please write your age:	_____				
What is your height?	_____ft/in OR _____m/cm				
What is your weight?	_____st/lb OR _____kg				
In which department of your organisation do you work?	_____				
What is your job title?	_____				
How many hours do you work per week?	_____				

Physical demands at work:

At work I sit:	oNever	oSeldom	oSometimes	oOften	oAlways
At work I stand:	oNever	oSeldom	oSometimes	oOften	oAlways
At work I walk:	oNever	oSeldom	oSometimes	oOften	oAlways
At work I lift heavy loads:	oNever	oSeldom	oSometimes	oOften	oAlways
After working I am tired:	oVery often	oOften	oSometimes	oSeldom	oNever
At work I sweat:	oVery often	oOften	oSometimes	oSeldom	oNever
In comparison with others my own age, I think my work is physically:	oMuch heavier	oHeavier	oAs heavy	oLighter	oMuch lighter

Sport and Exercise Habits:

Do you play sport OR do any exercise? oNo	→Please go directly to table "Physical Activity Habits during Leisure Time" (next page)
oYes	→Please answer ALL questions in this table
• Which sport OR exercise do you do MOST frequently?	_____
• Where do you do it?	oAt work oOutside work
• How many hours per week?	o<1 o1-2 o2-3 o3-4 o>4
• How many months per year?	o<1 o1-3 o4-6 o7-9 o>9

• If you do a SECOND sport OR exercise, which one is it? • Where do you do it? • How many hours per week? • How many months per year?	_____ oAt work oOutside work o<1 o1-2 o2-3 o3-4 o>4 o<1 o1-3 o4-6 o7-9 o>9
• If you do a THIRD sport OR exercise, which one is it? • Where do you do it? • How many hours per week? • How many months per year?	_____ oAt work oOutside work o<1 o1-2 o2-3 o3-4 o>4 o<1 o1-3 o4-6 o7-9 o>9
If you DO take part in exercise AT WORK: • How long (in months) have you been exercising at work? • Did you participate REGULARLY in sport or exercise OUTSIDE work when you started exercising work?	o<1 o1-3 o3-6 o6-12 o>12 oNo oYes

Physical Activity Habits during Leisure Time:

In comparison with others my own age, I think my physical activity during LEISURE time is:	oMuch more oMore oThe same oLess oMuch less
During leisure time I sweat:	oVery often oOften oSometimes oSeldom oNever
During leisure time I play sport OR do exercise:	oNever oSeldom oSometimes oOften oVery often
During leisure time I watch TV	oNever oSeldom oSometimes oOften oVery often
During leisure time I walk:	oNever oSeldom oSometimes oOften oVery often
During leisure time I cycle:	oNever oSeldom oSometimes oOften oVery often
How many minutes do you walk AND/OR cycle PER DAY from work, shopping etc.:	o<5 o5-15 o15-30 o30-45 o>45
How do you rate the importance of Exercise programmes and exercise Facilities at work?:	oNot at all important oQuite important oVery important

Feelings at Work:

Please indicate how you have felt at work during the PAST WEEK:

Active:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Calm:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Distressed:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Sleepy:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Strong:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Excited:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Scornful:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Hostile:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Enthusiastic:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Dull:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Fearful:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Relaxed:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Peppy:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
At rest:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much

Nervous:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Drowsy:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Elated:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Placid:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Jittery:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much
Sluggish:	oNot at all	oSlightly	oModerately so	oQuite a lot	oVery much

Please indicate the degree to which you agree with the following:

0=Strongly disagree 10=Strongly agree

	1	2	3	4	5	6	7	8	9	10
I feel fairly well satisfied with my present job:	o	o	o	o	o	o	o	o	o	o
Most days I am enthusiastic about my work:	o	o	o	o	o	o	o	o	o	o
Each day of work seems like it will never end:	o	o	o	o	o	o	o	o	o	o
I find real enjoyment in my work:	o	o	o	o	o	o	o	o	o	o
I consider my job rather unpleasant:	o	o	o	o	o	o	o	o	o	o

How do you feel about yourself physically?

How important is your appearance to you?	oNot at all important oImportant oVery important
How satisfied are you with your appearance?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied
How important is your overall health to you?	oNot at all important oImportant oVery important
How satisfied are you with your overall health?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied
How important is your weight to you?	oNot at all important oImportant oVery important
How satisfied are you with your weight?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied
How important is your shape or body build to you?	oNot at all important oImportant oVery important
How satisfied are you with your shape or body build?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied
How important is your level of fitness to you?	oNot at all important oImportant oVery important
How satisfied are you with your level of fitness?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied
How important is your sexual attractiveness to you?	oNot at all important oImportant oVery important
How satisfied are you with your sexual attractiveness?	oCompletely dissatisfied oQuite dissatisfied oNeutral oQuite satisfied oCompletely satisfied

The next section will ask you firstly to decide which one of two statements in each row best describes you. Then, you go to that side of the statement in the same row and tick if it is "sort of true" for you or "really true" for you. Tick only ONE of the four boxes in each row.

Really true for me	**Sort of true for me**				**Sort of true for me**	**Really true for me**
o	o	Some people feel extremely proud of who they are and what they can do physically	**BUT**	Others are sometimes not quite as proud of who they are physically	o	o
o	o	Some people are sometimes not so happy with the way they are or what they can do physically	**BUT**	Others always feel happy about the kind of persons they are physically	o	o
o	o	When it comes to the physical side of themselves some people do not feel very confident	**BUT**	Others seem to have a real sense of confidence in the physical side of themselves	o	o
o	o	Some people always have a really positive feeling about the physical side of themselves	**BUT**	Others sometimes do not feel positively about the physical side of themselves	o	o
o	o	Some people wish they could have more respect for their physical selves	**BUT**	Others always have great respect for their physical selves	o	o
o	o	Some people feel extremely satisfied with the kind of persons they are physically	**BUT**	Others sometimes feel a little dissatisfied with their physical selves	o	o

What am I like?

Really true for me	Sort of true for me				Sort of true for me	Really true for me
o	o	Some adults like the way they are leading their lives	**BUT**	Other adults don't like the the way they are leading their lives	o	o
o	o	Some adults are very happy being the way they are	**BUT**	Other adults would like to be different	o	o
o	o	Some adults sometimes question whether they are a worthwhile person	**BUT**	Other adults feel that they are a worthwhile person	o	o
o	o	Some adults are disappointed with themselves	**BUT**	Other adults are quite pleased with themselves	o	o
o	o	Some adults are dissatisfied with themselves	**BUT**	Other adults are satisfied with themselves	o	o
o	o	Some adults like the kind of person they are	**BUT**	Other adults would like to be someone else	o	o
o	o	Some adults are not satisfied with the way they do their work	**BUT**	Other adults are satisfied with the way they do their work	o	o
o	o	Some adults feel they are very good at their work	**BUT**	Other adults worry about whether they can do their work	o	o
o	o	Some adults are not very Productive in their work	**BUT**	Other adults are very productive in their work	o	o
o	o	Some adults are proud of their work	**BUT**	Other adults are not very proud of what they do	o	o

Life Satisfaction:

Please indicate the extent to which you agree to the following statements:
1=strongly disagree, 2=disagree, 3=slightly disagree, 4=neither agree or disagree, 5=slightly agree, 6=agree, 7=strongly agree

	1	2	3	4	5	6	7
In most ways my life is close to my ideal	o	o	o	o	o	o	o
The conditions of my life are excellent	o	o	o	o	o	o	o
I am satisfied with my life	o	o	o	o	o	o	o
So far I have gotten the important things I want in life	o	o	o	o	o	o	o
If I could live my life over, I would change almost nothing	o	o	o	o	o	o	o

Please indicate whether you would be willing to be interviewed for 20-25 minutes within the next few months as a follow-up to the questionnaires.
Please include my name for: oInterview oPrize Draw o Individual Profile (tick as appropriate)
Name:_____ E-mail:_____ Telephone no.:_____
Thank you very much for your cooperation!

APPENDIX 3

INTERVIEW GUIDE

Introduction

- Who I am (interviewer)
- The purpose of the interview: The purpose of this interview is to gain further insight into your feelings relating to work and life in general. This interview is strictly confidential, so your identity will not be disclosed to any member of your organisation or in any reports or publications made as a result of this interview.
- Tape recording: Before we start, I'd like to ask for your permission to audio-tape the interview, as I can then transcribe it in detail (provide participant with written consent form).
- Sign consent form

Turn on the tape recorder

1) Learning about the job

- What do you do in your job?
- How long have you been doing this job?
- What do you consider the main demands in your job?

2) Relationships among well-being variables

Two laminated signs are put on the table in front of the interviewee as a prompt [job satisfaction and life satisfaction]

- How do job satisfaction and life satisfaction relate in your life?
    - If job satisfaction increase, what happens to your satisfaction with life?
    - Which one causes the other?
    - How reliant are you on your job for feeling good about yourself?

Sign with moods at work are put on the table

- How do positive or negative moods at work relate to your job satisfaction?

Signs with feelings of work productivity are put on the table

- How do feelings of work productivity relate to moods at work?
    - And job satisfaction?

Signs with feeling good about what you can do physically, satisfaction with health and satisfaction with appearance are put on the table

- How do these physical aspects of yourself fit in with the rest of your life?
    - How reliant are you on the physical aspects of yourself to feel good about yourself?

3) Physical activity habits and psycho-social mechanisms explaining the relationship between physical activity and mental well-being

Sign with physical activity is put on the table

- Can you tell me a bit about your exercise/physical activity history?
    - What do you do?
    - How often do you do it?
    - For how long have you been physically active?
    - What are your major reasons for exercising?
- I'd like to know whether you think physical activity fits in with any of the things we have talked about before?
    - How does it relate to your feelings about yourself physically?
        - Why do you think that is the case?
    - How does it relate to your feelings at work?
        - Why do you think that is the case?
    - How does it relate to your feelings of work productivity?
        - Why do you think that is the case?
    - How does it relate to your self-esteem?
        - Why do you think that is the case?
    - How does it relate to your satisfaction with life?
        - Why do you think that is the case?

4) Level, sources and changes in well-being

- If you imagine a scale from one to ten, where one represents complete lack of satisfaction with your life, and ten represents complete happiness with your life, how close have you ever been to ten?
    - When?

- What was it about that situation that made you this happy?
- What do you have to do in order to retain that level of satisfaction?
- What do you have to resist?

- Thinking back eight months when you replied to the questionnaire, on the same scale (1-10), how would you rate your satisfaction with life at that stage?
  - Why was it at that level at the time?
  - How would you compare it to how you feel about it at the moment?
  - What is different now OR why do you think it hasn't changed [depending on previous response]?

- How would you rate your level of self-esteem eight months ago?
  - Why was it at that level at the time?
  - How would you compare it to how you feel about it at the moment?
  - What is different now OR why do you think it hasn't changed [depending on previous response]?

- How would you rate your feelings about the physical aspects of yourself eight months ago?
  - Why was it at that level at the time?
  - How would you compare it to how you feel about it at the moment?
  - What is different now OR why do you think it hasn't changed [depending on previous response]?

- How would you compare your physical activity habits eight months ago with how they are at the moment?

Conclusion

- We have now come to the end of the interview. But I would like to ask you one final question. If you had known how the interview would have been like before, would you still have agreed to participate?
- I really appreciate your help. Thank you very much for your participation

Interviewee leaves address for me to send a copy of the transcript and the results.

APPENDIX 4

Exercise and Health Sciences

Well-being and work

We are a team of researchers and professionals here in the University interested in improving well-being in a range of populations and settings. Many of our projects address lifestyle issues such as nutrition, exercise and stress.

We sometimes forget that the university with its 5000 staff is the equivalent of a medium sized corporation. To address this we intend over the next few years, in collaboration with our Personnel Office, to increase our research activity into the well-being of university employees. In turn, we hope we can feed back valuable information that will improve policy and practice.

To begin with we would like to ask you some questions about yourself and your lifestyle. As we are also about to open a new Centre for Sport, Exercise and Health incorporating a Healthy Living Unit, there will be a leaning towards questions concerning physical activity.

A questionnaire will arrive in hard copy tomorrow and it would be very helpful if you could complete this so that we can have your responses and views. In the top corner will be a code. This will allow us the opportunity to repeat the questionnaire in the future and link your sets of responses to detect any change. The code key will be kept securely to ensure your responses and name cannot be connected. If you are unhappy with that arrangement, simply peel off and discard the code label. We will be glad to have your contribution either way. It is very important that we achieve a high response rate to this questionnaire. Apart from the contribution it will make to the success of research into well-being here at work, it will also form a significant part of a PhD dissertation and MSc thesis. I do hope that you can help out.

If you have any questions, please feel free to contact Cecilie or Baz.

Professor Ken Fox - Head of Department
Cecilie Thogersen: E.C.Thogersen@bristol.ac.uk
Basilie Moffat: bazmoffat@hotmail.com

APPENDIX 5

Well-being and work

Dear University of Bristol employee

You should have received a questionnaire by now asking you to take part in a survey which examines well-being, work, and lifestyle.

The questionnaire is an important part of postgraduate work in the Department of Exercise and Health Sciences, and represents an important step in identifying ways of improving work life at the University.

Furthermore, it asks you to state your preferences for activities and programmes at the new exercise and health centre being established at the University.

Your response is very important to us, and we sincerely hope that you will be able to participate.

Thank you in advance.

Cecilie Thogersen & Baz Moffat.

APPENDIX 6

Well-being and work

Dear University of Bristol employee.

First of all we would like to take this opportunity to thank everyone who has replied to the questionnaire you received through internal mail a few weeks ago. We believe that you have helped us to gain some important insight into well-being issues that may affect employees at the University. The prize draw will be announced within the next few weeks.

IF YOU HAVE NOT ALREADY FILLED IN THIS QUESTIONNAIRE, once again, we would like to reiterate how important your reply is to us. Every single reply is important to produce research that is representative of different groups of people. Therefore, if you can spare any time at work or at home to fill in the questionnaire you have received through internal mail, then we would greatly appreciate your help. You may benefit as you will be included in a prize draw to win £100.

Once again, thank you in advance.

Yours sincerely,

Cecilie Thogersen & Baz Moffat

APPENDIX 7

Well-being and work

You should have received an e-mail yesterday asking you whether you are able to spare a moment to reply to this questionnaire, which forms a very important part of our postgraduate work. Our trial has shown that the questionnaire takes 15-20 minutes to complete.

Filling in this questionnaire will really help us to better understand how to improve work life and well-being at the University. Your response is therefore very important to us.

To provide a bit of an incentive, we are glad to be able to enter your return into a free prize draw of £100. The winner will be announced within the next month.

Your name has been coded for follow-up purposes, but your identity will under no circumstances be entered into any analysis, but is treated in the strictest of confidence. If, however, you do not feel happy with the coding system and want to remain completely anonymous, simply tear off the coded tag from the top right-hand corner of this page before returning the completed questionnaire.

If you are happy to fill in this questionnaire, after completing it, please return it in the A5 sized self-addressed envelope provided through internal mail, within the next two weeks. We really do appreciate your help with filling in this questionnaire.

Cecilie Thogersen, PhD Candidate

Baz Moffat, MSc Candidate

Note: Should you have any questions relating to this questionnaire, please do not hesitate to e-mail me, Cecilie Thogersen, at E.C.Thogersen@bristol.ac.uk

PART A: Self-Evaluation Questionnaire

- What is your date of birth? ____/____/19____
- What is your gender? o Male o Female
- Marital status o Single o Married
- What is your approximate weight? _____st._____lbs. OR _____kg.
- What is your approximate height? _____ft._____in. OR _____m_____cm.
- Where do you work? o Senate House o Other support services o Academic dept.
- What is your job role? o Secretarial o Administrative o Other
- Please indicate your current job band (i.e. 1-6 OR A-F): _____
- What % of time are you employed (i.e. 100%=full-time)? o 25% o 50%
  o 75% o 100%

PART B: Your recent feelings at work

Please indicate how you have felt **AT WORK DURING THE PAST WEEK** (please tick):

Active:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Calm:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Distressed:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Sleepy:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Strong:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Excited:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Scornful:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Hostile:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Enthusiastic:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Dull:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Fearful:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Relaxed:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Peppy (full of vigour):	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
At rest:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Nervous:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Drowsy:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Elated:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Placid:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Jittery:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much
Sluggish:	ONot at all	OSlightly	OModerately so	OQuite a lot	OVery much

Please indicate the extent to which you agree with the following:

0=Strongly disagree 10=Strongly agree

	0	1	2	3	4	5	6	7	8	9	10
I feel fairly well satisfied with my present job:	o	o	o	o	o	o	o	o	o	o	o
Most days I am enthusiastic about my work:	o	o	o	o	o	o	o	o	o	o	o
Each day of work seems like it will never end:	o	o	o	o	o	o	o	o	o	o	o
I find real enjoyment in my work:	o	o	o	o	o	o	o	o	o	o	o
I consider my job rather unpleasant:	o	o	o	o	o	o	o	o	o	o	o

PART C: The physical side of yourself

Please indicate how satisfied you are with physical aspects of yourself (please tick):

1=Completely dissatisfied, 2=Quite dissatisfied, 3=Neutral, 4=Quite satisfied, 5=Completely satisfied

	1	2	3	4	5
How satisfied are you with your appearance?	o	o	o	o	o
How satisfied are you with your overall health?	o	o	o	o	o
How satisfied are you with your weight?	o	o	o	o	o
How satisfied are you with your shape or body build?	o	o	o	o	o

The next section will ask you firstly to decide which one of two statements **in each row** best describes you. Then, you go to that side of the statement **in the same row** and tick if it is "sort of true" for you or "really true" for you. Tick only **ONE** of the four boxes in each row. The first one is an example: I ticked the first box on the right hand side because I felt that it is "sort of true" that I do not feel very physically fit (if I felt fit, I would tick one of the boxes on the left-hand side)

Really true for me	**Sort of true for me**	**EXAMPLE**			**Sort of true for me**	**Really true for me**
O	O	Some people feel they ar very physically fit	**BUT**	Others do not feel very physically fit	√	O

Really true for me	**Sort of true for me**				**Sort of true for me**	**Really true for me**
O	O	Some people feel extremely proud of who they are and what they can do physically	**BUT**	Others are sometimes not quite as proud of who they are physically	O	O
O	O	Some people are sometimes not so happy with the way they are or what they can do physically	**BUT**	Others always feel happy about the kind of persons they are physically	O	O
O	O	When it comes to the physical side of themselves, some people do not feel very confident	**BUT**	Others seem to have a real sense of confidence in the physical side of themselves	O	O
O	O	Some people always have a really positive feeling about the physical side of themselves	**BUT**	Others sometimes do not feel positively about the physical side of themselves	O	O
O	O	Some people wish they could have more respect for their physical selves	**BUT**	Others always have great respect for their physical selves	O	O
O	O	Some people feel extremely satisfied with the kind of persons they are physically	**BUT**	Others sometimes feel a little dissatisfied with their physical selves	O	O

PART D: You and your life as a whole

Really true for me	Sort of true for me				Sort of true for me	Really true for me
O	O	Some adults like the way they are leading their lives	**BUT**	Other adults don't like the way they are leading their lives	O	O
O	O	Some adults are very happy being the way they are	**BUT**	Other adults would like to be different	O	O
O	O	Some adults sometimes question whether they are a worthwhile person	**BUT**	Other adults feel that they are a worthwhile person	O	O
O	O	Some adults are disappointed with themselves	**BUT**	Other adults are quite pleased with themselves	O	O
O	O	Some adults are dissatisfied with themselves	**BUT**	Other adults are satisfied with themselves	O	O
O	O	Some adults like the kind of person they are	**BUT**	Other adults would like to be someone else	O	O
O	O	Some adults are not satisfied with the way they do their work	**BUT**	Other adults are satisfied with the way they do their work	O	O
O	O	Some adults feel they are very good at their work	**BUT**	Other adults worry about whether they can do their work	O	O
O	O	Some adults are not very productive in their work	**BUT**	Other adults are very productive in their work	O	O
O	O	Some adults are proud of their work	**BUT**	Other adults are not very proud of what they do	O	O

Please indicate the extent to which you agree with the following statements:

1=strongly disagree, 2=disagree, 3=slightly disagree, 4=neither agree or disagree, 5=slightly agree, 6=agree, 7=strongly agree

	1	2	3	4	5	6	7
In most ways my life is close to my ideal	O	O	O	O	O	O	O
The conditions of my life are excellent	O	O	O	O	O	O	O
I am satisfied with my life	O	O	O	O	O	O	O
So far I have got the important things I want in life	O	O	O	O	O	O	O
If I could live my life over, I would change nothing	O	O	O	O	O	O	O

PART E: Activity habits

Please indicate **as accurately as possible** those activities you have done for the past **three months at least once per week for at least 15 minutes CONTINUOUSLY (remember: do not include those sessions of activity that you do less than 15 minutes at a time)**

Activity	Usual pace of walking	Sessions per week	Minutes duration per session	Usual time of day	Do you usually walk on your own or with other people?
Walking	o casual (<2mph) o average (2-3mph) o fairly brisk (3-4mph) o brisk (4 mph or>)	____	____mins.	o Before work o Lunchtime o Afternoon o After work/ week-end	o on own o with others

- Do you regularly (min. once per week) walk to and from work? o Yes o No
  - If yes, how many of the above sessions are a result of walking to and from work?

o None o 1 o 2 o 3 o 4 or more

Activity	Sessions per week	Miles or km per session	Usual time of day	Do you usually bike on your own or with other people?
Bicycling	____	____miles OR ____km	o Before work o Lunchtime o Afternoon o After work/ week-end	o on own o with others

- Do you regularly (min. once per week) bike to and from work? o Yes o No
  - If yes, how many of the above sessions are a result of bicycling to and from work?

o None o 1 o 2 o 3 o 4 or more

Activity	Sessions per week	Minutes per session	Time of day	Do you usually exercise on your own OR exercise with others
Aerobic dance (all types)	____	____mins	O Before work O Lunchtime O Afternoon O After work/week-end	N/A
Running/jogging	____	____mins	O Before work O Lunchtime O Afternoon O After work/week-end	O on own O with others
Please name any other sport activity which makes you breathe at least moderately hard(e.g. squash, football, swimming): **1.**_____ **2.**_____	_____	____mins	O Before work O Lunchtime O Afternoon O After work/week-end	O on own O with others

PART F: Feelings about exercise

Please indicate your reasons for exercising regularly OR what your reasons would be if you started exercising regularly

0=not true for me, 1=not very true for me, 2=sometimes true for me, 3=quite true for me, 4=very true for me

"I exercise because/I would exercise if"

	0	1	2	3	4
Other people say (said) I should	o	o	o	o	o
I feel (felt) ashamed when I miss (missed) an exercise session	o	o	o	o	o
It's (was) important to me to exercise regularly	o	o	o	o	o
It's (was) fun	o	o	o	o	o
I get (got) pleasure and satisfaction from participating in exercise	o	o	o	o	o
My friends/family/spouse say (said) I should	o	o	o	o	o
I value (valued) the benefits of exercise	o	o	o	o	o
I (would) get restless if I don't (didn't) exercise regularly	o	o	o	o	o
Others will (would) not be pleased if I don't (didn't)	o	o	o	o	o
I enjoy (enjoyed) my exercise sessions	o	o	o	o	o
I feel (felt) like a failure when I haven't (hadn't) exercised in a while	o	o	o	o	o
I think (thought) it is (was) important to make the effort to exercise regularly	o	o	o	o	o
I find (found) exercise a pleasurable activity	o	o	o	o	o
I feel (felt) under pressure from my friends/family to exercise	o	o	o	o	o
I feel (felt) guilty when I don't (didn't) exercise	o	o	o	o	o

Please indicate the extent to which you agree with the following statements

1=strongly disagree, 2=disagree, 3=somewhat agree, 4=agree, 5=strongly agree

	1	2	3	4	5
I consider myself an exerciser	O	O	O	O	O
When I describe myself to others, I usually include my involvement in exercise	O	O	O	O	O
I have numerous goals related to exercising	O	O	O	O	O
Physical exercise is a central factor to my self-concept	O	O	O	O	O
I need to exercise to feel good about myself	O	O	O	O	O
Others see me as someone who exercises regularly	O	O	O	O	O
For me, being an exerciser means more then just exercising	O	O	O	O	O
I would feel a real loss if I were forced to give up exercising	O	O	O	O	O
Exercising is something I think about often	O	O	O	O	O

PART G: Reasons for not exercising

If you see yourself as someone who does not exercise regularly, please fill in the table below by indicating the degree to which you believe the following is applicable to you (otherwise go to Part I)

1=Does not correspond at all 7=Corresponds exactly

	1	2	3	4	5	6	7
I don't think that taking part in an exercise programme is really going to improve my general state of health	O	O	O	O	O	O	O
I just can't seem to make the effort to change my exercise habits	O	O	O	O	O	O	O
I don't feel I have the competence to start exercising	O	O	O	O	O	O	O
What little exercise I could do would not have any impact on my general state of health	O	O	O	O	O	O	O
I don't think the exercise programmes that I have seen on offer would be effective for me to improve my general state of health	O	O	O	O	O	O	O
I can't seem to find it in me to make the necessary sacrifices	O	O	O	O	O	O	O
I don't have what it takes to start exercising	O	O	O	O	O	O	O
I don't think I'd be able to change anything about my exercise habits	O	O	O	O	O	O	O

Do you intend to start any exercise classes or self-directed exercise/sports regularly **(i.e. at least once per week for at least 15 minutes continuously per session)** within the next six months? o Yes o No

Do you intend to start walking or cycling to work regularly **(i.e. at least once per week for at least 15 minutes continuously per session)** within the next six months? o Yes o No

PART H: Your personal needs

From September, the new Centre for Sport, Exercise and Health will be open and will incorporate a healthy living centre. Tick any of the following that you may be interested in

Physiotherapy		Podiatry		Osteopathy		Other. Please specify: _____
Massage		Reflexology		Acupuncture		
Weight management		Health and fitness appraisal		Stress management		
Counselling		Lifestyle advice		Children's health		
Back care		Women's health		Smoking cessation		

- Do you currently own a Staff Sports Card? o Yes o No
- Are you currently a member of another health club? o Yes o No

Now, please indicate which activities you would consider doing in the new Centre for Health and Exercise by filling in the table below

Activity	Level	Type of session	Time of day
Aerobic dance (e.g. step classes, Hi-Lo)	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Circuits (stage based exercise class)	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Conditioning classes (e.g. Bums+Tums, Pilates)	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Yoga	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Dance (e.g. salsa, line dancing, tap)	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Gym (individual work-outs involving weights, steppers, bikes, treadmills etc.)	N/A	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Sports (incl. badminton, football). Please specify: _____	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end
Other. Please specify: _____	o Beginner o Intermediate o Advanced	o Mixed o Ladies only o Age 60+	o Before work o Lunchtime o After work/ evening/week-end

Please check that you have completed all questions and return the completed questionnaire in the self-addressed envelope provided!

THANK YOU

We really appreciate your help with filling in this questionnaire!

MANUSCRIPTS, PRESENTATIONS AND ABSTRACTS DURING THE PHD

Manuscripts

- Thøgersen, C., Fox, K.R., & Ntoumanis, N. (2002). Testing the mediating role of physical acceptance in the relationship between physical activity and self-esteem: An empirical study with Danish public servants. *European Journal of Sports Science, 2*, 1-13.
- Thøgersen, C., Fox, K.R., & Ntoumanis, N. Relationships between exercise and three components of mental well-being in corporate employees. Manuscript submitted for publication.
- Thøgersen, C., Fox, K.R., & Ntoumanis, N. Physical activity and mental well-being typologies in corporate employees. Manuscript under preparation.

Presentations and abstracts

- Thøgersen, C., & Fox, K.R. (2001, May-June). Relationships between exercise and components of mental well-being in corporate employees. Paper presented at the 10th World Congress of Sport Psychology, International Society of Sport Psychology, Skiathos, Greece. Abstract published in Papaioannou, A., Goudas, M., & Theodorakis, Y. (Eds.), *In the dawn of the new millennium: Programme and proceedings* (Vol. 1), pp. 289-291. Christodoulidi Publications: Thessaloniki, Hellas.
- Thøgersen, C., Fox, K.R., & Ntoumanis, N. (2002). Exercise and mental well-being typologies of corporate employees: A cluster analysis. Abstract published in *Journal of Sport and Exercise Psychology, 24(Suppl.),* S123-S124.